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TRADE MARK REG. U. S. PAT. OFF.

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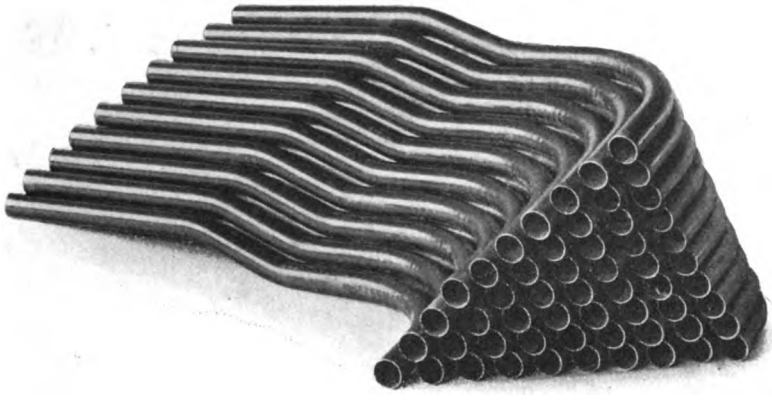

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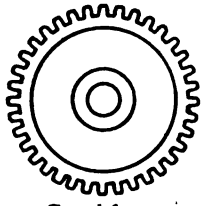

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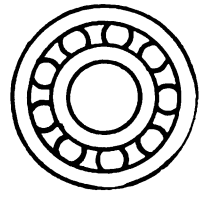

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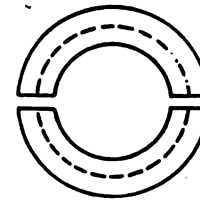

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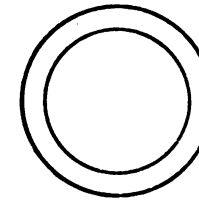

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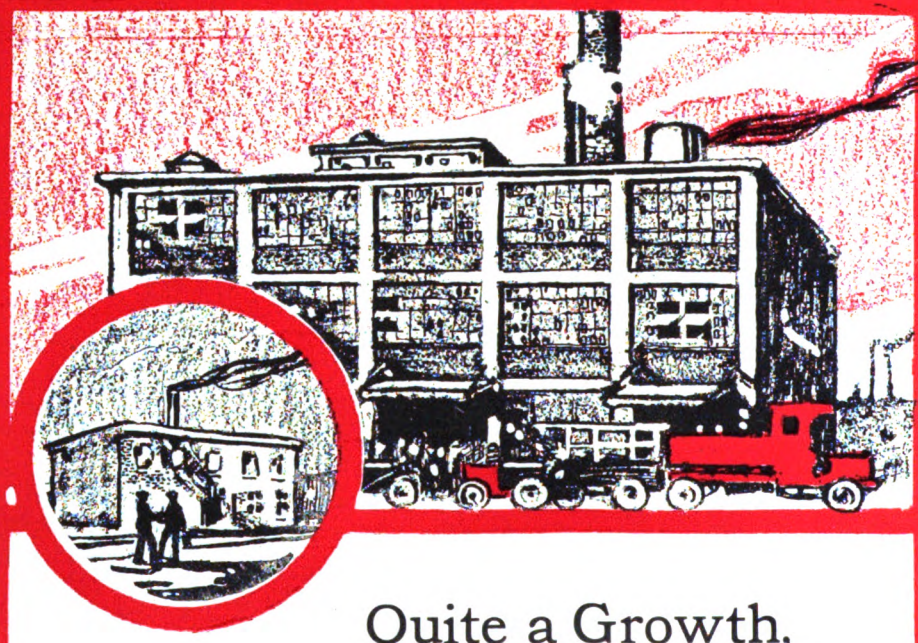

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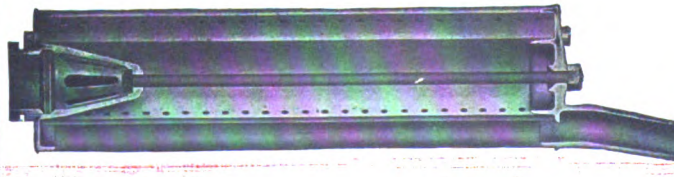

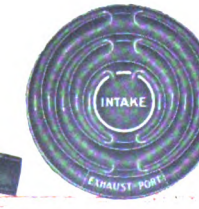

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A Classified Trade Directory of the Automobile and Commercial Vehicle Industries, containing the Names and Addresses of the American Manufacturers of Automobiles and Commercial Vehicles and of the Makers of Materials, Component Parts, Accessories, Machinery, Tools, Shop Equipment and Supplies. Contains also a Directory of National Trade Associations, Tables and Data and other pertinent information.

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VOL. XIII, NO. 1
JANUARY, 1915

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Subscription Price, $10.00 per year
Single Copies, - - $ 5.00 prepaid

Published quarterly by

The Automobile Trade Directory
INCORPORATED
243-249 West 39th Street, New York

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The Automobile Trade Directory

Published Quarterly by

The Automobile Trade Directory, Inc.

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Represented by

THOS. M. SPINING.....505 Free Press Bldg., Detroit
C. P. COX.....910 So. Michigan Ave., Chicago
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Address all communications to publication office

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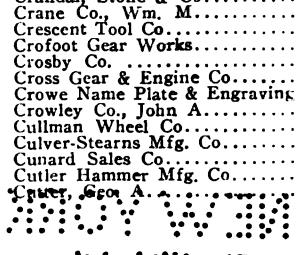

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Complete Vehicles

PART I

Complete Vehicles

Parts and

Classified Lists of the Manufacturers of Automobiles and Commercial Vehicles

Index to classifications in this section appears on page 8

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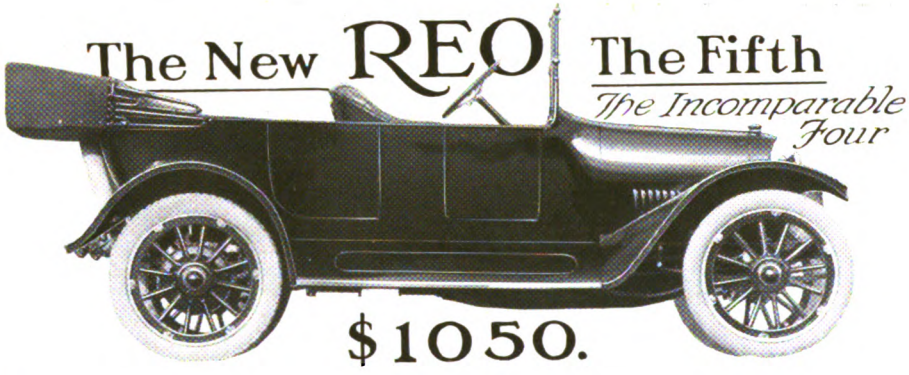

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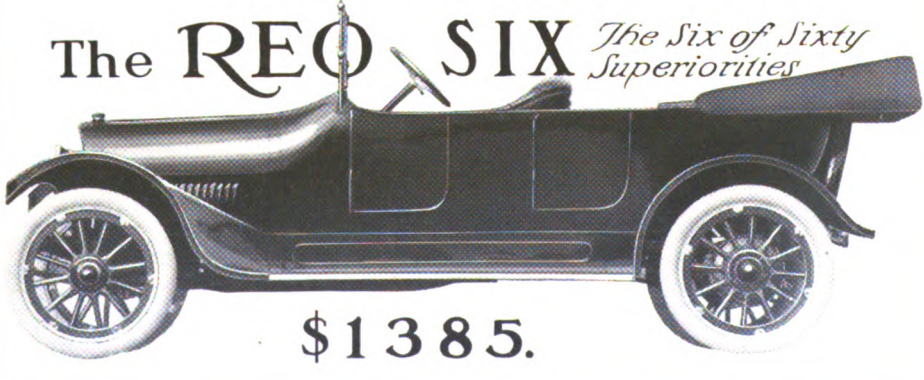

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Part I

COMPLETE VEHICLES

PLEASURE VEHICLES

GASOLINE VEHICLES

ALLEN Motor Co., Fostoria, O.

AMERICAN Voiturette Co., Lawton Ave. & M. C. R. R., Detroit, Mich. "Keeton," "Car-Nation."

APPERSON Bros. Automobile Co., Kokomo, Ind. "Jack Rabbit."

AUBURN Automobile Co., Auburn, Ind.

AUSTIN Automobile Co., 82-104 S. Division St., Grand Rapids, Mich.

BARLEY, A. C., Streator, Ill. "Halladay."

BARTHOLOMEW Co. (Prospect Heights), Peoria, Ill. "Glide."

BELMONT Motor-Vehicle Co., Green St., Castleton, N. Y.

BRIGGS-DETROITER Co., 537 Holbrook Ave., Detroit, Mich. "Detroiter." (See page 543.)

BRISCOE Motor Co., Jackson, Mich. (See page 529.)

BUCKEYE Mfg. Co., 154 Columbus Ave. Anderson, Ind. "Lambert."

BUICK Motor Co., Hamilton Ave., Flint, Mich.

BURNS Bros., Havre de Grace, Md.

CADILLAC Motor Car Co., 1343 Cass Ave., Detroit, Mich.

CAR-NATION—See American Voiturette Co.

CARROLL Motor Car Co., Main St., Strasburg, Pa.

CARTERCAR Co., Pontiac, Mich.

CASE, T. M., Co., J. I., State St., Racine, Wis.

CHADWICK Engineering Works, Keim St., Pottstown, Pa.

CHALMERS Motor Co., E. Jefferson Ave. & New Belt Line, Detroit, Mich.

CHANDLER Motor Car Co., Cleveland, O. (See page 529.)

CHEVROLET Motor Co., Flint, Mich.

CLEBURNE Motor Car Mfg. Co., Cleburne, Tex.

COLE Motor Car Co., Indianapolis, Ind. (See page 529.)

COWLES-MACDOWELL Pneumobile Co., 1601 McCormick Bldg., Chicago, Ill.

CRAWFORD Automobile Co., Surrey & Summit Aves., Hagerstown, Md.

CRESCENT Motor Co., Cincinnati, O.

CROW Motor Car Co., Main & Simonton Sts., Elkhart, Ind.

CUNNINGHAM, Son & Co., James, 18 Canal St., Rochester, N. Y.

DAVIS Motor Car Co., Geo. W., 11th & E. Sts., Richmond, Ind.

DETROITER—See Briggs-Detroiter Co.

DILE Motor Car Co., Eighth & Oley Sts., Reading, Pa.

DODGE Bros., Detroit, Mich.

DORRIS Motor Car Co., 4100 Laclede Ave., St. Louis, Mo.

DUSSEAU Fore & Rear Drive Auto Co., 310 Erie St., Toledo, O.

ELKHART Carriage & Harness Mfg. Co., Elkhart, Ind. "Pratt."

EMPIRE Automobile Co., 560 Capitol Ave., Indianapolis, Ind. (See page 529.)

ENGER Motor Car Co., 2100 Gest St., Cincinnati, O.

F-I-A-T Co., Poughkeepsie, N. Y.

FIRESTONE—See New Columbus Buggy Co.

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PLEASURE VEHICLES (Continued)

GASOLINE VEHICLES (Continued)

FORD Motor Co., Woodward Ave., Detroit, Mich.

FOUR Wheel Drive Auto Co., Clintonville, Wis.

FRANKLIN Machine Co., 770 Franklin Ave., Brooklyn, N. Y.

FRANKLIN Mfg. Co., H. H., 101 W. Marcellus St., Syracuse, N. Y.

GLIDE—See Bartholomew Co.

GRANT Motor Co., Findlay, O.

GREAT Western Automobile Co., Peru, Ind.

HALLADAY—See Barley, A. C.

HAYNES Automobile Co., 11 Main St., Kokomo, Ind.
(See page 649.)

HERRESHOFF Light Car Co., Troy, N. Y.

HOWARD—See Lexington Howard Co.

HUDSON Motor Car Co., Jefferson Ave. & Connors Creek, Detroit, Mich.

HUPMOBILE—See Hupp Motor Car Co.

HUPP Motor Car Co., Mt. Elliott & Milwaukee Aves., Detroit, Mich. "Hupmobile."

IMPERIAL Automobile Co., Jackson, Mich.
(See page 517.)

INTER-STATE Motor Co., Muncie, Ind.

INTERNATIONAL Harvester Co. of America, Akron, O.

JACK RABBIT—See Apperson Bros., Automobile Co.

JACKSON Automobile Co., E. Main & Horton Sts., Jackson, Mich.

JEFFERY Co., Thomas B., Kenosha, Wis.
(See page 553.)

KEARNS Motor Truck Co., Beavertown, Pa.
(See page 517.)

KEETON—See American Voiturette Co.

KING Motor Car Co., 1300-24 Jefferson Ave., Detroit, Mich.
(See page 517.)

KISSEL KAR—See Kissel Motor Car Co.

KISSEL Motor Car Co., 121 Kissel Ave., Hartford, Wis. "Kissel Kar."

KLINE Motor Car Corp., Richmond, Va.

KNOX Motors Co., 53 Wilbraham Rd., Springfield, Mass.

K-R-I-T Motor Car Co., Mt. Elliott Ave. & E. Grand Blvd., Detroit, Mich.

L. P. C. Motor Co., Racine, Wis. "Lewis."

LAMBERT—See Buckeye Mfg. Co.

LENOX Motor Car Co., Hyde Park, Mass.

LEWIS—See L. P. C. Motor Co.

LEXINGTON Howard Co., Connersville, Ind. "Howard."
(See page 549.)

LOCOMOBILE Co. of America, 2 Main St., Bridgeport, Conn.

LUVERNE Automobile Co., Maple & McKenzie Sts., Luverne, Minn.

LYONS ATLAS Co., Indianapolis, Ind.
(See page 650.)

McFARLAN Motor Car Co., Connersville, Ind.

McINTYRE Co., W. H., Auburn, Ind.

MARION Motor Co., Oliver Ave. & Drover St., Indianapolis, Ind.

MARMON—See Nordyke & Marmon Co.

MAXWELL Motor Co., Detroit, Mich.
(See page 543.)

MERCER Automobile Co., 500 Whitehead Rd., Trenton, N. J.

METEOR Motor Car Co., Piqua, O.

METZ Co., Waltham, Mass.
(See page 543.)

MITCHELL-LEWIS Motor Co., Racine, Wis.
(See page 649.)

MOLINE Automobile Co., 300 Palmer St., East Moline, Ill.
(See page 545.)

MONARCH Motor Car Co., Detroit, Mich.
(See page 557.)

MONROE Motor Co., Flint, Mich.

MOON Motor Car Co., St. Louis, Mo.
(See page 517.)

MOTOR Car Mfg. Co., Box 584, Indianapolis, Ind. "Pathfinder," "Parry."
(See page 549.)

MOYER, H. A., Park & Wolf Sts., Syracuse, N. Y.

NATIONAL Motor Vehicle Co., 1020 E. 62d St., Indianapolis, Ind.

NEW Columbus Buggy Co., Dublin Ave., Columbus, O. "Firestone."

NORDYKE & Marmon Co., 1101-31 W. Morris St., Indianapolis, Ind. "Marmon."

NORWALK Motor Car Co., Martinsburg, W. Va.

OAKLAND Motor Car Co., Pontiac, Mich.
(See page 45.)

OLDS Motor Works, Lansing, Mich. "Oldsmobile."

OLDSMOBILE—See Olds Motor Works.

OVERLAND—See Willys-Overland Co.

PACKARD Motor Car Co., N. Grand Blvd. & Belt Line, Detroit, Mich.

PAIGE-DETROIT Motor Car Co., Detroit, Mich.
(See page 549.)

PARRY—See Motor Car Mfg. Co.

PATERSON Co., W. A., Flint, Mich.
(See page 543.)

PATHFINDER—See Motor Car Mfg. Co.

PEERLESS Motor Car Co., Quincy Ave. & S. E. 93d St., Cleveland, O.

PIERCE Arrow Motor Car Co., 1695 Elmwood Ave., Buffalo, N. Y.

PILOT Motor Car Co., Richmond, Ind.

PRATT—See Elkhart Carriage & Harness Mfg. Co.

PRINCESS Motor Car Co., 348 Clay St., Detroit, Mich.

PULLMAN Motor Car Co., York, Pa.
(See page 545.)

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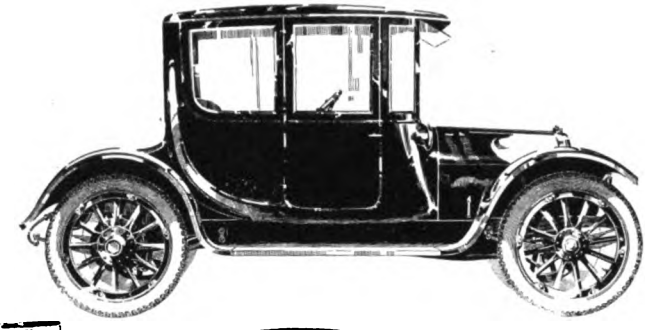

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GASOLINE VEHICLES (Continued)

R-C-H Corp., 138 Lycaste St., Detroit, Mich.

RAYFIELD Motor Co., Chrisman, Ill.

REGAL Motor Car Co., Detroit, Mich. **(See page 545.)**

REMINGTON Motor Co., 2 Columbus Circle, New York, N. Y.

REO Motor Car Co., Lansing, Mich. **(See page 32.)**

REPUBLIC Motor Car Co., Hamilton, O.

ROYAL Tourist Car Co., L. S. & M. S. Ry. & E. 72d St., Cleveland, O.

S. G. V. Co., N. Eighth St., Reading, Pa.

ST. LOUIS Motor Truck Co., 4274-76 Easton Ave., St. Louis, Mo.

SAXON Motor Co., 1305 Bellevue Ave., Detroit, Mich.

SCRIPPS-BOOTH Co., Detroit, Mich. **(See page 37.)**

SEBRING Motor Car Co., Sebring, O.

SELDEN Motor Vehicle Co., University Ave. & Probert St., Rochester, N. Y.

SIMPLEX Automobile Co., New Brunswick, N. J.

SINGER Motor Co., Blvd., 13th & 14th Sts., Long Island City, N. Y.

SPAULDING Mfg. Co., Grinnell, Ia.

SPEEDWELL Motor Car Co., Dayton, O. **(See page 549.)**

SPOERER'S Sons Co., Carl, 901-09 S. Carey St., Baltimore, Md.

STAFFORD Motor Car Co., 22d & Campbell Sts., Kansas City, Mo.

STEARNS Co., F. B., Cleveland, O. **(See page 545.)**

STERLING Motor Co., 705 Centre St., Brockton, Mass.

STEVENS-DURYEA Co., Chicopee Falls, Mass. **(See page 557.)**

STUDEBAKER Corp., Detroit, Mich.

STUTZ Motor Car Co., 430-32 N. Capitol Ave., Indianapolis, Ind.

TRIUMPH Motor Car Co., 3308 Sheffield Ave., Chicago, Ill.

UNITED States Carriage Co., 309-19 S. Fourth St., Columbus, O.

VELIE Motor Vehicle Co., Moline, Ill.

VULCAN Mfg. Co., 475 Richmond St., Painesville, O.

WASHINGTON Motor Car Co., Hyattsville, Md.

WAYNE Works, 16th & F. Sts., Richmond, Ind.

WESTCOTT Motor Car Co., 12th & N. E. Sts., Richmond, Ind.

WHITE Co., Cleveland, O.

WILLYS-OVERLAND Co., Toledo, O. "Overland." **(See page 35.)**

WINTON Motor Car Co., 10601 Berea Rd., Cleveland, O.

ZIMMERMAN Mfg. Co., 411 Indiana Ave., Auburn, Ind.

ELECTRIC VEHICLES

AMERICAN Electric Car Co., 1215 S. Jefferson Ave., Saginaw, Mich. "Argo," "Broc," "Borland."

ANDERSON Electric Car Co., Detroit, Mich. "Detroit." **(See page 637.)**

ARGO—See American Electric Car Co.

BAILEY & Co., S. R., 895 Boylston St., Boston, Mass.

BAKER Motor Vehicle Co., Cleveland, O. **(See page 637.)**

BORLAND—See American Electric Car Co.

BROC—See American Electric Car Co.

BUFFALO Electric Vehicle Co., 1227 Main St., Buffalo, N. Y.

CENTURY Electric Car Co., Detroit, Mich.

CHICAGO Electric Motor Car Co., 3612-18 S. Morgan St., Chicago, Ill.

DAYTON Electric Car Co., Fourth & St. Clair Sts., Dayton, O.

DETROIT—See Anderson Electric Car Co.

FIRESTONE—See New Columbus Buggy Co.

FLANDERS Electric, S. Saginaw St., Pontiac, Mich.

FRITCHLE Automobile & Battery Co., 1510-30 Clarkson St., Denver, Colo.

GRINNELL Electric Car Co., 14-16 Atwater St., E., Detroit, Mich.

HUPP-YEATS Electric Car Co., Lycaste St. & Detroit Terminal, Detroit, Mich.

NEW COLUMBUS Buggy Co., Dublin Ave., Columbus, O. "Firestone."

OHIO Electric Car Co., 1501-07 W. Bancroft St., Toledo, O.

RAUCH & Lang Carriage Co., 2180 W. 25th St., Cleveland, O. **(See page 553.)**

STANDARD Car Mfg. Co., Park Ave., Jackson, Mich.

WARD Motor Vehicle Co., E. 143d St. & Concord Ave., New York, N. Y.

WAVERLEY Co., 139 S. East St., Indianapolis Ind.

WOODS Motor Vehicle Co., Cottage Grove, Calumet & 25th St., Chicago, Ill.

STEAM VEHICLES

ROSS, Louis S., 38 Crafts St., Newtonville, Mass.

STANLEY Motor Carriage Co., Hunt St., Newton, Mass.

CYCLECARS

AMERICAN Volturette Co., Lawton Ave. & M. C. R. R., Detroit, Mich. "Car-Nation."

AUTOMOBILE Cycle Car Co., Wayne Co. Bank Bldg., Detroit, Mich. "Tiger."

BURROWS Cyclecar Co., Ripley, N. J.

Complete Index to Classification appears on Pages 8 to 26.

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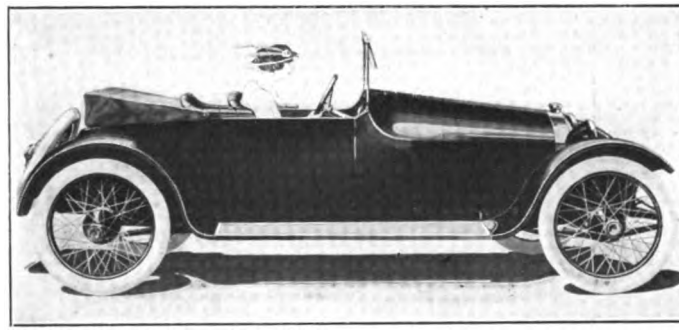
Scripps Booth



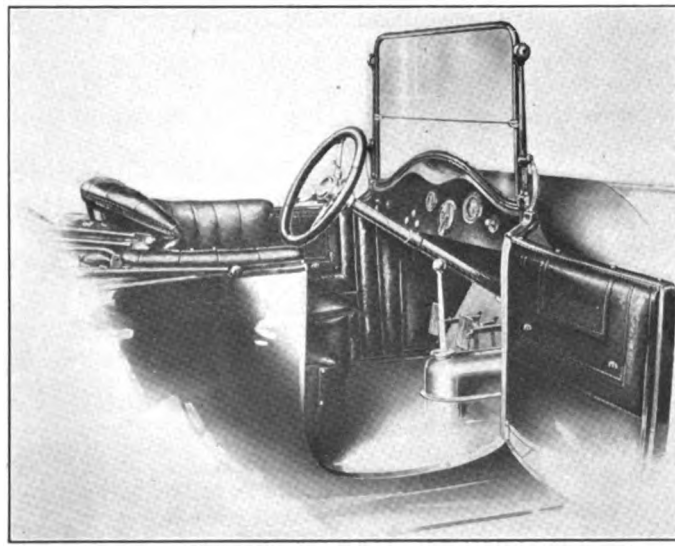
NEW YEAR

The Spirit of the New Year is for better things.

The world builds on the progress of the past; each new idea, a step, each year, an epoch.

With each succeeding twelvemonth of motor car progress comes greater demand for new comfort, further luxury and more complete appointment.

SCRIPPS-BOOTH luxurious light cars offer in mechanism, the newest engineering ideas of comfort-efficiency; in appointments and interior, the newest standard of luxurious equipment; in road performance, the highest possible standard of riding comfort; and in detail, show a consistent betterment of past motor car efforts, which expresses in itself the very spirit of the New Year.



SCRIPPS-BOOTH COMPANY, - - Detroit

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PLEASURE VEHICLES (Continued)

CYCLECARS (Continued)

CAR-NATION—See American Voiturette Co.

CRESSON-MORRIS Co., 18th St. & Allegheny Ave., Philadelphia, Pa. "Duryea."

DETROIT Cycle Car Co., 504-08 Elks Temple, Detroit, Mich.

DURYEA—See Cresson-Morris Co.

FALCON Cyclecar Co., Staunton, Va.

IMP—See McIntyre Co.

INTERNATIONAL Cycle-Car & Accessories Co., Security Bldg., Chicago, Ill. "Woods Mobilette."

LA VIGNE Cyclecar Co., 641 Commonwealth Ave., Detroit, Mich.

LOS ANGELES Cycle Car Co., 612 S. Olive St., Los Angeles, Cal.

MC INTYRE Co., W. H., Auburn, Ind. "Imp."

MALCOLM Cyclecar Co., Plymouth, Mich.

MERZ Cyclecar Co., 1419 South Eastern Ave., Indianapolis, Ind.

PILGRIM Motor Car Co., Detroit, Mich. (See page 557.)

RAYFIELD Motor Co., Chrisman, Ill.

REX Motor Co., Labadie St. (Ford City), Wyandotte, Mich.

SALVADOR Motor Co., 126 Massachusetts Ave., Boston, Mass. (See page 553.)

STICKNEY Co., Charles A., St. Paul, Minn.

TIGER—See Automobile Cycle Car Co.

TRUMBULL Motor Car Co., Connecticut & Florence Aves., Bridgeport, Conn.

TWOMBLY Car Corp., 1790 Broadway, New York, N. Y.

WOODS MOBILETTE—See International Cycle-Car & Accessories Co.

ZIP Cyclecar Co., 827 W. Second St., Davenport, Iowa.

IMPORTED VEHICLES

ADAMS-LANCIA Co., 235 W. 58th St., New York, N. Y. "Lancia."

AUSTRIAN-DAIMLER—See Healey & Co.

BENZ Auto Import Co., 250 W. 54th St., New York, N. Y. "Gaggenau."

BREWSTER & Co., Queensboro Bridge Plaza, Long Island City, N. Y. "Delauney-Belleville."

CAVALIERI, R. A., 103 W. 57th St., New York, N. Y. "Napier."

CLEMENT-BAYARD—See LaCroix Auto Co.

CRYDER & Co., 583 Park Ave., New York, N. Y. "Leon Bollee."

DAIMLER Mfg. Co., 1784 Broadway, New York, N. Y.

DARRACQ—See Ducasse & Co., Henry.

DE DION-BOUTON Selling Branch, 1649 Broadway, New York, N. Y.

DELAUNEY-BELLEVILLE—See Brewster & Co.

DEMAREST & Co., A. T., Broadway & 57th St., New York, N. Y. "Itala."

DUCASSE & Co., Henry, 733 Seventh Ave., New York, N. Y. "Darracq."

FIAT Automobile Co., 1776 Broadway, New York, N. Y.

GAGGENAU—See Benz Auto Import Co.

HEALEY & Co. Broadway & 51st St., New York, N. Y. "Austrian-Daimler," "Panhard."

ISOTTA Fraschini Motors Co., 1920 Broadway, New York, N. Y.

ITALA—See Demarest & Co., A. T.

LA CROIX Auto Co., Paul, 1770 Broadway, New York, N. Y. "Clement-Bayard," "Zedel."

LANCIA—See Adams-Lancia Co.

LEON BOLLEE—See Cryder & Co.

MERCEDES Repair Co., 159 E. 54th St., New York, N. Y.

METALLURGIQUE Motor Co., 1876 Broadway, New York, N. Y.

MOTO-BLOC Import Co., 2008 Broadway, New York, N. Y.

NAPIER—See Cavalieri, R. A.

PANHARD—See Healey & Co.

PEUGEOT Auto Import Co., 59th St. & Fifth Ave., New York, N. Y.

RENAULT Selling Branch, 1770 Broadway, New York, N. Y.

ROLLS ROYCE—See Schutte, R. W.

S. P. O. Automobile Co., 244 W. 49th St., New York, N. Y.

SCHUTTE, R. W., 236 W. 54th St., New York, N. Y. "Rolls Royce."

ZEDEL—See La Croix Auto Co.

ZUST Motor Co., 235-37 W. 50th St., New York, N. Y.

COMMERCIAL VEHICLES

GASOLINE VEHICLES

A & R—See Abendroth & Root Mfg. Co.

ABENDROTH & Root Mfg. Co., 45 Broadway, New York, N. Y. "A. & R."

ADAMS Bros. Co., Findlay, O.

ÆTNA Motor Truck Co., Detroit, Mich. (See page 43.)

ARMLEDER Co., O., Plum, Charles & 12th Sts., Cincinnati, O.

ATTERBURY Motor Car Co., Hertel & Elmwood Aves., Buffalo, N. Y.

AUBURN Motor Chassis Co., Auburn, Ind.

AUGLAIZE Motor Car Co., New Bremen, O.

AUTOCAR Co., Ardmore, Pa.

AVAILABLE Truck Co., 1539 N. 47th Ave., Chicago, Ill.

AVERY Co., Peoria, Ill.

BARKER, C. L., Norwalk, Conn.

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SELLING FLEETS OF COMMERCE CARS

Big merchants who began with two and three Commerce Cars are now installing fleets of Commerce Cars as the solution of their delivery problems.

They have tested the Commerce Car as they once tested adding machines and cash registers and found it to be an actual business economy and, consequently, a sound business investment.

Every Commerce Car in operation today is selling Commerce Cars. It's actual performance is its best selling point. Merchants are buying Commerce Cars today on the records of the Commerce Cars operated by their competitors.

This is the fourth year of the Commerce Car. And the enormous demand for the Commerce this year is due, we believe, to our two years of experimenting and testing under the severest possible conditions before we offered the Commerce Car for sale.

Today we know we have the simplest, most dependable, most efficient and most economical delivery car on the market.

And the sale of the Commerce confirms that judgment.

Commerce Car dealers deserve a large share of the credit of Commerce success.

We have selected them very slowly and carefully. They are business men—in the automobile business for consistent growth and permanent, legitimate profits. They have the spirit of the Commerce Motor Car Company. Many of them are pleasure car dealers who have been progressive enough to install a Delivery Car Department and thereby establish a steady twelve-month-a-year business.

They have found the Commerce Car to be precisely all we claimed for it—a single chassis, a single model (that's all we make) "fool-proof" delivery car for which the merchant of the big city and the merchant of the small town have been waiting for ten years.

If you are that kind of a dealer, we want you. Write or wire for details. Better yet, come to Detroit, see the Commerce Car and the Commerce factory and sense the spirit of our whole organization.

The Commerce Motor Car Company

ADMINISTRATION DEPARTMENT

625-630 Penobscot Bldg., Detroit, Mich.

SPECIFICATIONS:

1000-pound capacity, 25 per cent. overload, guaranteed.
Equipment, including electric horn, complete.
32 x 3½ Goodyear pneumatic tire, or 34 x 2½ Goodyear Motz truck tire.
Express, full panel, or canopy top.
Clear floor space—64 inches long; 42 inches wide; 52½ inches high.
Gear ratio—6 to 1 on high; 20 to 1 on low.
Friction drive. Wheelbase—102 inches.

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COMMERCIAL VEHICLES (Continued)

GASOLINE VEHICLES (Continued)

BARTHOLOMEW Co. (Prospect Heights), Peoria, Ill.

BECK & Son, 901-03 First Ave. W., Cedar Rapids, Ia.

BESSEMER Motor Truck Co., Grove City, Pa.
(See page 43.)

BLAIR Motor Truck Co., 16th St. & B. & O. R. R., Newark, O.

BOWLING Green Motor Truck Co., Bowling Green, O. "Modern."

BROCKWAY Motor Truck Co., 106 Railroad St., Cortland, N. Y.

BROOKS-LATTA Automobile Mfg. Co., 4255 Fairfax Ave., St. Louis, Mo.

BUCKEYE Mfg. Co., 154 Columbus Ave., Anderson, Ind.

BUICK Motor Co., Hamilton Ave., Flint, Mich.

CARROLL Motor Car Co., Main St., Strasburg, Pa.

CASS—See Independent Motors Co.

CHASE Motor Truck Co., Syracuse, N. Y.

CHICAGO Pneumatic Tool Co., Fisher Bldg., Chicago, Ill. "Little Giant."

CLARK, Edward S., 242 Freeport St. (Dorchester), Boston, Mass.

CLARK Delivery Car Co., 76th St. & Greenwood Ave. (Grand Crossing), Chicago, Ill.

CLEBURNE Motor Car Mfg. Co., Cleburne, Tex.

COLEMAN Motor Truck Co., Morgan & Main Sts., Ilion, N. Y.

COMMERCE Motor Car Co., 625-30 Penobscot Bldg., Detroit, Mich.
(See page 39.)

CONTINENTAL Truck Mfg. Co., 1702 16th St., Superior, Wis.

CORBITT Automobile Co., Henderson, N. C.

COUPLE-GEAR Freight-Wheel Co., 1450 Buchanan St., Grand Rapids, Mich.

CRESCENT Motor Co., Cincinnati, O.

CROW Motor Car Co., Main & Simonton Sts., Elkhart, Ind.

CROWN Commercial Car Co., North Milwaukee, Wis.

CURTIS—See Pittsburg Machine Tool Co.

DART Motor Truck Co., Ainsborough & Stratford Aves., Waterloo, Ia.

DAYTON Auto Truck Co., 725 E. First St., Dayton, O.

DENBY Motor Truck Co., Detroit, Mich.
(See page 637.)

DETROIT-WYANDOTTE Motor Co., Wyandotte, Mich. "Horner."

DORRIS Motor Car Co., 4100 Laclede Ave., St. Louis, Mo.

DRIGGS-SEABURY Ordnance Corp., Sharon, Pa. "Vulcan."
(See page 157.)

DURANT-DORT Carriage Co., (Flint Motor Wagon Dept.), Flint, Mich.

DUSSEAU Fore & Rear Drive Auto Co., 310 Erie St., Toledo, O.

ERIE Motor Truck Mfg. Co., 220 W. 12th St., Erie, Pa.

FARGO Motor Car Co., 1164-66 W. 22d St., Chicago, Ill.

FEDERAL Motor Truck Co., Detroit, Mich.

FOUR Wheel Drive Auto Co., Clintonville, Wis.

FRANKLIN Machine Co., 770 Franklin Ave., Brooklyn, N. Y.

FRONT Drive Motor Co., 16th St. & Willow Ave., Hoboken, N. J.

GABRIEL Auto Co., 315 Prospect Ave. W., Cleveland, O.

GARFORD—See Willys-Overland Co.

GENERAL Motors Truck Co., Pontiac, Mich.

GENEVA Automobile Co., 145 Castle St., Geneva, N. Y.

GRAMM-BERNSTEIN Co., Lima, O.

GRAMM Motor Truck Co., Lima, O.

HAHN Motor Truck & Wagon Co., S. Fourth St., Hamburg, Pa.

HARDER Auto-Truck Co., 40th St. & Calumet Ave., Chicago, Ill.

HARRISON Co., Robert, 324-33 W. First St., (S. Boston), Boston, Mass.

HARVEY Motor Truck Works, Harvey, Ill.

HARWOOD-BARLEY Mfg. Co., Marion, Ind. "Indiana."

HERCULES Motor Truck Co., First & L Sts. (S. Boston), Boston, Mass.

HEWITT—See International Motor Co.

HORNER—See Detroit-Wyandotte Motor Co.

ICE Mfg. Co., 1480 Broadway, New York, N. Y.

IDEAL Auto Co., 616-50 High St., Fort Wayne, Ind.

INDIANA—See Harwood-Barley Mfg. Co.

INDEPENDENT Motors Co., Port Huron, Mich. "Cass."

INTERNATIONAL Harvester Co. of America, Akron, O.

INTERNATIONAL Motor Co., 64th St. & West End Ave., New York, N. Y. "Mack," "Saurer," "Hewitt."

JEFFERY Co., Thomas B., Kenosha, Wis.
(See page 553.)

KALAMAZOO Motor Vehicle Co., 418 N. Church St., Kalamazoo, Mich.

KELLY-SPRINGFIELD Motor Truck Co., Burt & Sheridan Sts., Springfield, O.

KING Mfg. Co., A. R., Kingston, N. Y.

KISSEL Motor Car Co., 121 Kissel Ave., Hartford, Wis.

KLEIBER & Co., 1424-40 Folsom St., San Francisco, Cal.

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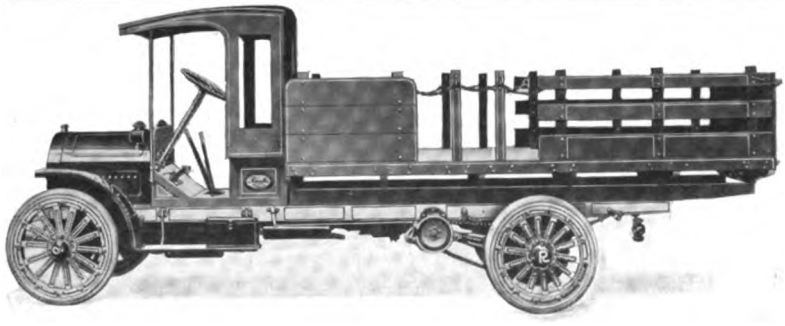
Republic Trucks are Rapid Sellers



Model D Chassis. Model F Body. Cab Top

1,500 Pound Capacity	2,000 Pound Capacity	3,000 Pound Capacity
$995.00	$1350.00	$1475.00

THE RECOGNIZED STANDARD IN TRUCKS OF THIS CAPACITY

Send now for REPUBLIC literature and dealer proposition

REPUBLIC MOTOR TRUCK COMPANY

ALMA, : : : : : : MICHIGAN

STANDARD OF OHIO

MANUFACTURERS OF

1, 1½, 2 and 3½ Ton Motor Trucks

Write for our Standard of Ohio Book on Motor Trucks

THE STANDARD MOTOR TRUCK CO. (of Ohio)

Factory and Main Office
WARREN, OHIO

Sales Office
1824 Euclid Ave., CLEVELAND, O.

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COMMERCIAL VEHICLES (Continued)

GASOLINE VEHICLES (Continued)

KNOX Motors Co., 53 Wilbraham Rd., Springfield, Mass.

KOEHLER S. G. Co., H. J., 291 Halsey St., Newark, N. J.

KOSMATH Co., 708 Ford Bldg., Detroit, Mich.
(See page 637.)

KREBS Commercial Car Co., Clyde, O.

KRICKWELL Motor Truck Co., 1373 E. 55th St., Chicago, Ill.

LAUTH-JUERGENS Motor Car Co., Fremont, O.

LANGE Motor Truck Co., 145 S. St. Clair St., Pittsburg, Pa.

LEWIS Motor Truck Co., 12th & Oak Sts., Oakland, Cal.

LIPPARD-STEWART Motor Car Co., 228 W. Utica St., Buffalo, N. Y.

LITTLE GIANT—See Chicago Pneumatic Tool Co.

LOCOMOBILE Co. of America, 2 Main St., Bridgeport, Conn.

McINTYRE Co., W. H., Auburn, Ind.

MACCAR Truck Co., Scranton, Pa.

MACK—See International Motor Co.

MAIS Motor Truck Co., Indianapolis, Ind.

MARMON—See Nordyke & Marmon Co.

MARTIN Carriage Works, York, Pa.

MENOMINEE—See Poyer & Co.

MILWAUKEE—See Smith Co.

MODERN—See Bowling Green Motor Truck Co.

MOELLER—See New Haven Truck & Auto Works.

MOGUL Motor Truck Co., 6100 Maple Ave., St. Louis, Mo.

MONITOR Automobile Works, 207 N. Academy St., Janesville, Wis.

MOON Buggy Co., Jos. W., 4400 N. Main St., St. Louis, Mo.

MOORE—See Pacific Metal Products Co.

MORELAND Motor Truck Co., 1701 N. Main St., Los Angeles, Cal.

MOTOKART Co., 1790 Broadway, New York, N. Y.
(See page 43.)

NATCO—See National Motor Truck Co.

NATIONAL Motor Truck Co., Bay City, Mich. "Natco."

NELSON & Le Moon, 815 N. Kedzie Ave., Chicago, Ill.

NEW Haven Truck & Auto Works, 166-68 St. John St., New Haven, Conn. "Moeller."

NORDYKE & Marmon Co., 1101-31 W. Morris St., Indianapolis, Ind. "Marmon."

OLD Reliable Motor Truck Co., 3921 S. Michigan Ave., Chicago, Ill.

OVERLAND—See Willys-Overland Co.

PACIFIC Metal Products Co., Torrance, Cal. "Moore."

PACKARD Motor Car Co., N. Grand Blvd & Belt Line, Detroit, Mich.

PALMER-MOORE Co., 110 N. Geddes St., Syracuse, N. Y.

PEERLESS Motor Car Co., Quincy Ave. & S. E. 93d St., Cleveland, O.

PIERCE Arrow Motor Car Co., 1695 Elmwood Ave., Buffalo, N. Y.

PITTSBURG Machine Tool Co., Braddock, Pa. "Curtis."

PLYMOUTH Motor Truck Co., Plymouth, O.

POYER & Co., D. F., Broadway & Saxton Ave., Menominee, Mich. "Menominee."

PRATT, Carter, Sigsbee & Co., 772 Howard St., Detroit, Mich.

REO Motor Car Co., Lansing, Mich.
(See page 32.)

REPUBLIC Motor Truck Co., Alma, Mich.
(See page 41.)

ROBINSON Motor Truck Co., Second Ave. & Seventh St., Minneapolis, Minn.

ROWE Motor Mfg. Co., Downingtown, Pa.

ST. LOUIS Motor Truck Co., 4274-76 Easton Ave., St. Louis, Mo.

SANDOW Truck Co., 2916-20 W. Lake St., Chicago, Ill.

SANFORD Motor Truck Co., W. Fayette St. & St. Marks Pl., Syracuse, N. Y.

SAURER—See International Motor Co.

SAYERS & Scovill Co., 2247-61 Colerain Ave., Cincinnati, O.

SCHLEICHER Motor Vehicle Co., Ossining, N. Y.

SELDEN Motor Vehicle Co., University Ave. & Probert St., Rochester, N. Y.

SERVICE Motor Car Co., Wabash, Ind.

SIEBERT Motor Truck Co., 530 Ontario St., Toledo, O.

SIGNAL Motor Truck Co., Detroit, Mich.
(See page 43.)

SMITH Co., A. O., Milwaukee, Wis. "Milwaukee."
(See page 367.)

SPEEDWELL Motor Car Co., Dayton, O.
(See page 549.)

SPOERER'S Sons Co., Carl, 901-09 S. Carey St., Baltimore, Md.

STANDARD Motor Truck Co., Detroit, Mich.

STANDARD Motor Truck Co., 1824 Euclid Ave., Cleveland, O.
(See page 41.)

STAPF & Co., John M., 228 Central Ave., Dunkirk, N. Y.

STAR Motor Car Co., Summit & Wildt Sts., Ann Arbor, Mich.

STEGEMAN Motor Car Co., 606 Linus St., Milwaukee, Wis.

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ÆTNA

WORM-DRIVE-TRUCKS

"The Expert Truck"

Standard Parts---Universally Approved

Compare Quality, Efficiency and Price

1½ Ton, $2150 **2½ Ton, $2400**

ÆTNA TRUCKS combine simplicity, durability and economy. They are built for you, as we would expect you to build a truck for us, using the most universally approved parts.

SPECIFICATIONS

Power Plant, Three point suspension. Hazard Motors, Sheldon Axles and Springs, Imported David Brown Worm and Gear, Brown-Lipe Transmission, Ross Steering Gear, Eiseman Automatic Magneto, Schebler Model R. Automatic Carburetor, Standard Adjustable Taper Roller Universal Joints, Left Hand Drive, Center Control.

OUR DEALERS PROPOSITION AND DETAILED CATALOGUE WILL INTEREST YOU. WRITE US TO-DAY.

ÆTNA MOTOR TRUCK CO.
Detroit Mich.

Dealers

We have a real selling proposition—

1 ton $1250
1½ ton $1800
2 ton Worm Drive $2300

Think this over and write for a Catalogue.

Bessemer Motor Truck Co.
Grove City Pa.

MotoKart Parcel Carriers

Solve the light delivery problem.
Low in First Cost
Economical in Upkeep
Efficient in Operation
Capacity, Exclusive of Driver. 500 lb.
Price, Open or Closed Body..$365.00
Write for agency terms.

The MotoKart Company
Factories: Peekskill and Tarrytown, N. Y.
General Office:
1790 Broadway, New York City

SIGNAL

ONE TON MOTOR TRUCKS

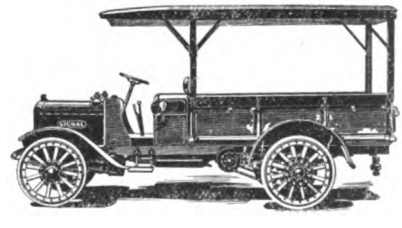
WORM DRIVE—CHAIN DRIVE

Built of Standard Parts Throughout

Timken Axles and Bearings, Continental Motor, Gemmer Steering Gear, Detroit Springs, Covert Transmission, Russel Jack Shaft.

A Full Line of Open and Closed Bodies

Worm Drive Chassis, $1,500
Chain Drive Chassis, $1,400



Signal Motor Truck Company
DETROIT, U. S. A.

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COMMERCIAL VEHICLES (Continued)

GASOLINE VEHICLES (Continued)

STERNBERG Mfg. Co. (W. Allis), Milwaukee, Wis.

STEWART Motor Corp., Superior & Randall Sts., Buffalo, N. Y.

STUDEBAKER Corp., Detroit, Mich.

SULLIVAN Motor Car Co., 1703 East Ave., Rochester, N. Y.

TIFFIN Wagon Co., Tiffin, O.

TOEPPNER Bros., Bay City, Mich.

TOLEDO Carriage Woodwork Co., La Grange & Water Sts., Toledo, O. "Trojan."

TOURAINE Co., Broad & Huntington Sts., Philadelphia, Pa. "Vim."

TRIUMPH Motor Car Co., 3308 Sheffield Ave., Chicago, Ill.

TROJAN—See Toledo Carriage Woodwork Co.

UNITED States Carriage Co., 309-19 S. Fourth St., Columbus, O.

UNITED States Motor Truck Co., 17th & Madison Sts., Covington, Ky.

UNIVERSAL Motor Truck Co., 500 Theodore St., Detroit, Mich.

UTILITY—See Willys-Overland Co.

VEERAC Motor Co., Anoka, Minn.

VELIE Motor Vehicle Co., Moline, Ill.

VIM—See Touraine Co.

VULCAN—See Driggs-Seabury Ordnance Corp.

WAGENHALS Motor Co., 668-70 Grand River Ave., Detroit, Mich.

WALTER Motor Truck Co., 49-51 W. 66th St., New York, N. Y.

WARE Motor Vehicle Co., 771 Raymond Ave., St. Paul, Minn.

WASHINGTON Motor Car Co., Hyattsville, Md.

WHITE Co., Cleveland, O.

WHITE Star Motor & Engineering Co., 1400 Atlantic Ave., Brooklyn, N. Y.

WICHITA Falls Motor Co., Wichita Falls, Tex.

WILCOX Motor Car Co., H. E., 1030 Marshall St., N. E., Minneapolis, Minn.

WILLET Engine & Truck Co., 6-8 Lock St., Buffalo, N. Y.

WILLYS-OVERLAND Co., Toledo, O. "Overland," "Garford," "Utility." (See page 35.)

WILSON Co., J. C., 15th & Warren Aves., Detroit, Mich.

ELECTRIC VEHICLES

AMERICAN Electric Car Co., 1215 S. Jefferson Ave., Saginaw, Mich. "Argo."

ANDERSON Electric Car Co., Detroit, Mich. "Detroit." (See page 637.)

ARGO—See American Electric Car Co.

BAKER Motor Vehicle Co., Cleveland, O. (See page 637.)

BUFFALO Electric Vehicle Co., 1227 Main St., Buffalo, N. Y.

COMMERCIAL Truck Co. of America, 27th & Brown Sts., Philadelphia, Pa.

COUPLE-GEAR Freight-Wheel Co., 1450 Buchanan St., Grand Rapids, Mich.

DAYTON Electric Car Co., Fourth & St. Clair Sts., Dayton, O.

DETROIT—See Anderson Electric Car Co.

FRITCHLE Automobile & Battery Co., 1510-30 Clarkson St., Denver, Colo.

G. V.—See General Vehicle Co.

GALION Dynamic Motor Truck Co., Galion, O.

GENERAL Motors Truck Co., Pontiac, Mich.

GENERAL Vehicle Co., Long Island City, N. Y. "G. V." (See page 553.)

KENTUCKY Wagon Mfg. Co., Third & K Sts., Louisville, Ky. "Urban."

URBAN—See Kentucky Wagon Mfg. Co.

WALKER Vehicle Co., 531-45 W. 39th St., Chicago, Ill.

WARD Motor Vehicle Co., E. 143d St. & Concord Ave., New York, N. Y.

WAVERLEY Co., 139 S. East St., Indianapolis, Ind.

STEAM VEHICLES

BELL Locomotive Works, Yonkers, N. Y.

IMPORTED VEHICLES

ARIES—See Jaccard & Co.

BENZ Auto Import Co., 250 W. 54th St., New York, N. Y. "Gaggenau."

BUSSING Agency, 1777 Broadway, New York, N. Y.

DE DION-BOUTON Selling Branch, 1649 Broadway, New York, N. Y.

DUCASSE & Co., Henry, 733 Seventh Ave., New York, N. Y. "Orion."

GAGGENAU—See Benz Auto Import Co.

HEALEY & Co., Broadway & 51st St., New York, N. Y. "Panhard."

JACCARD & Co., J., 213 W. 69th St., New York, N. Y. "Aries."

ORION—See Ducasse & Co.

PANHARD—See Healey & Co.

TAXICABS

FORD Motor Co., Woodward Ave., Detroit, Mich.

PULLMAN Motor Car Co., York, Pa. (See page 545.)

THOMAS Motor Cab Co., 184-88 W. Mohawk St., Buffalo, N. Y.

WHITE Co., Cleveland, O.

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A Big Year for Oakland Dealers

The beautiful new Oakland, built around the famous efficient Oakland-Northway motor, with the 51 distinct improvements and refinements this year, is in for a sales season that will smash all records.

See the New

Oakland

A Complete Line of Fours and Sixes

Five Models, - $1150 to $1685

New Oakland Features That Make It the Big Seller This Year:

Increased Power — Improved Oakland-Northway power plant with increased power and silence, extra large valves, Tungsten steel, special designed manifolds and throttle valve.

Beauty of Body Lines—Distinctive and exclusive New Oakland full stream line body, unbroken curves from radiator to rear seat, clean sides, broad aluminum covered running boards and heavy crown fenders.

Roominess and Comfort—Extra leg room in all models for driver and passengers, extra wide deep seats.

Road Efficiency—Low center of gravity without decreased road clearance. New Oaklands hug the road and are easy to handle.

V-Shaped German Silver Radiator: Plenty of water room for long tours, enhanced beauty.

Add to these the elimination of half the oil cups, latest Standard Delco starting, lighting and ignition system, automatic spark advance, non-skid tires in rear, Oakland one-man top and other features, and you will understand how Oakland beauty is backed up by thorough car building. If you are in open territory, we have a liberal proposition for you.

SEE THE NEW OAKLAND

Oakland Motor Car Company
Pontiac, Mich.

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COMMERCIAL VEHICLES (Continued)

MOTOR PROPELLED FIRE APPARATUS

ADAMS Bros. Co., Findlay, O.

AHRENS-FOX Fire Engine Co., Alfred & Cook Sts., Cincinnati, O.

AMERICAN & British Mfg. Co., Providence, R. I.

AMERICAN-LA FRANCE Fire Engine Co., Elmira, N. Y.

ANDERSON Coupling & Fire Supply Co., Sixth St. & Reynolds Ave., Kansas City., Kans.

AUTOCAR Co., Ardmore, Pa.

BOYD & Bro., Jas., 25th & Wharton Sts., Philadelphia, Pa.

COUPLE-GEAR Freight-Wheel Co., 1450 Buchanan St., Grand Rapids, Mich.

FEDERAL Motor Truck Co., Detroit, Mich.

HOWE Engine Co., Indianapolis, Ind.

KELLY-SPRINGFIELD Motor Truck Co., Burt & Sheridan Sts., Springfield, O.

KISSEL Motor Car Co., 121 Kissel Ave., Hartford, Wis.

KNOX Motors Co., 53 Wilbraham Rd., Springfield, Mass.

LIPPARD-STEWART Motor Car Co., 228 W. Utica St., Buffalo, N. Y.

LOCOMOBILE Co. of America, 2 Main St., Bridgeport, Conn.

LUITWEILER Pumping Engine Co., 123 Ames St., Rochester, N. Y.

NOTT Fire Engine Co., 1624 Central Ave., Minneapolis, Minn.

OLDS Motor Works, Lansing, Mich.

PACKARD Motor Car Co., N. Grand Blvd. & Belt Line, Detroit, Mich.

PEERLESS Motor Car Co., Quincy Ave. & S. E. 93d St., Cleveland, O.

ROBINSON Fire Apparatus Mfg. Co., 4250-68 N. 20th St., St. Louis, Mo.

ROCHESTER Motor Fire Pump Co., Granite Bldg., Rochester, N. Y.

SEAGRAVE Co., Columbus, O.

WATEROUS Engine Works Co., 62 S. Robert St., St. Paul, Minn.

WHITE Co., Cleveland, O.

THE AUTOMOBILE TRADE DIRECTORY'S

Mailing List

Embraces the entire purchasing power, representing every phase of the automobile and motor truck industries.

It contains the names and addresses of all Automobile, Commercial Vehicle, Cycle Car and Motor manufacturers, together with the names of their Engineers, Purchasing Agents, Superintendents and other officials.

It also gives names and addresses of all Dealers or Agents for Automobiles and Motor Trucks, together with names of cars and trucks handled. Also the names and addresses of all Garages, Repair Shops, Charging Stations and of the Dealers and Jobbers of Supplies.

With this list at your command you can circularize the "Ford" dealers or the agents for any other particular make of car or truck. You can "follow up" a town, a city, a state, the United States or the whole North American continent and—you can rest assured that your mail matter—all of it—is addressed to only live and legitimate concerns. Write us for sample sheets and particulars.

THE AUTOMOBILE TRADE DIRECTORY

241-243 West 39th Street New York

Complete Index to Classification appears on Pages 8 to 26.

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Accessories, Parts, Materials and Supplies

PART II

Classified lists of the Manufacturers of Component Parts, Accessories, Materials and Supplies

A complete index to classifications appears on pages 8 to 26

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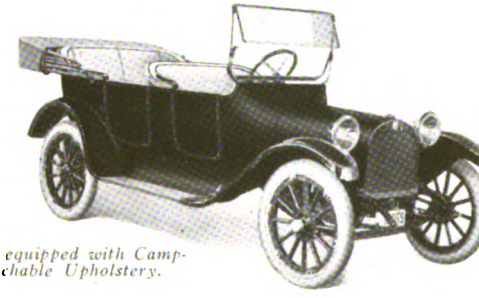
CAMPBELL GUARANTEED MOTOR CAR ACCESSORIES



Dodge Car, equipped with Campbell Detachable Upholstery.

Detachable Upholstery

Better than Seat Covers

Campbell Detachable Upholstery is the last word in motor luxury. Rare fabrics and colors that harmonize with every color scheme, faultless fit and wonderful durability characterize this new product of the famous house of Campbell.

Its quick detachable feature and its ease of cleaning make it a most attractive proposition to the trade and the car owner. Many fabrics, colors and prices in stock sizes to fit all popular makes and model of cars. Write for details.

ONE-MAN—ONE-HAND

Top—for light cars. Up or down in ten seconds. Genuine mohair, finest trimmings, best quality throughout. Ten second curtains and dust hood included.

PERCAMA
The Heavy Fabric Cleaner

Cleans tops, upholstery, rugs, mats all heavy fabrics that water will not injure. Safe, sure. Contains no explosive, will not injure rubber or waterproofing materials. Inexpensive to buy. Economical to use.

Quart, 25c.; ½ gal., 40c.; gal., 60c.

Write for Catalog

Showing our complete line, including the livest Ford Specialties on the market, auto straps of all kinds, robes, tourists' sleeping blankets, and dozens of other accessories. Write to

The Perkins Campbell Co.
634 Broadway
Cincinnati, Ohio

Dealers!

We have the fairest agency plan you ever read. Get in touch with us. Address all trade correspondence to the Sales Manager.

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Part II

PARTS AND ACCESSORIES

ACID

BATTERY ACID

(See Electrolyte, Battery)

SOLDERING ACID

(See Flux, Soldering)

ADAPTERS

ELECTRIC LAMP ADAPTERS

(For converting gas or oil lamps into electric lamps)

APELCO—See Apple Electric Co.

APPLE Electric Co., Newark, N. J. "Apelco."

ARSENO Electric Co., 819A Boylston St., Boston, Mass.

CHICAGO Electric Mfg. Co., 2817 S. Halsted St., Chicago, Ill. "Handy."

DIETZ Co., R. E., 60 Laight St., New York, N. Y. "Comet."

FAW, J. H., 41 Warren St., New York, N. Y. "Fawsco."

FAWSCO—See Faw, J. H.

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill.

GENERAL Electric Co., Schenectady, N. Y.

GIL-BO—See Metal Specialties Mfg. Co.

GRAY & Davis, Boston, Mass. (See page 159.)

HAMMER Co., E. A., 1839 Euclid Ave., Cleveland, O.

HANDY—See Chicago Electric Mfg. Co.

METAL Specialties Mfg. Co., 736-38 W. Monroe St., Chicago, Ill. "Gil-Bo."

MORSE, Frank W., 516 Atlantic Ave., Boston, Mass.

ROSCO—See Rosen & Co.

ROSEN & Co., A. W., 610-14 Broadway, New York, N. Y. "Rosco." (See page 139.)

S-H.—See Stuart-Howland Co.

STUART-HOWLAND Co., 131-41 Federal St., Boston, Mass. "S-H."

ALARMS

BOILER ALARMS

(See Columns, Water)

TIRE ALARMS

(For sounding an alarm when tires are under or over inflated)

GEM—See Safety Tire Signal Co.

POLO Tire Alarm Co., Great Northern Bldg., Chicago, Ill.

SAFETY Tire Signal Co., 655 12th St., Boulder, Colo. "Gem."

TERPENING, E. A., Mokena, Ill.

ALCOHOL

DENATURED ALCOHOL

JEFFERSON Distilling & Denaturing Co., New Orleans, La. "Radico."

PYRO—See United States Industrial Alcohol Co.

RADICO—See Jefferson Distilling & Denaturing Co.

UNITED States Industrial Alcohol Co., 27 William St., New York, N. Y. "Pyro."

WOOLNER Distilling Co., ft. Spillman St., Peoria, Ill.

Complete Index to Classification appears on Pages 8 to 26.

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ALUMINUM

SHEET AND ROD ALUMINUM

(For Aluminum Castings—See Castings, Aluminum)
(For Aluminum Tubing—See Tubing, Aluminum)

ALUMINUM Co. of America, Pittsburg, Pa.

AMMETERS

STANDARD AMMETERS AND VOLTMETERS

(For switchboard and electric vehicle use. For Pocket Meters—See Gauges, Battery)

CLARK Electric Meter Co., 219 S. Clinton St., Chicago, Ill.

GENERAL Electric Co., Schenectady, N. Y.

HOSKINS Mfg. Co., 453 Lawton Ave., Detroit, Mich. "International."

HOYT Electrical Instrument Works, Penacook, N. H.
(See page 177.)

INTERNATIONAL—See Hoskins Mfg. Co.

JEWELL Electrical Instrument Co., 810 W. Lake St., Chicago, Ill.

KEYSTONE Electrical Instrument Co., Ninth St. & Montgomery Ave., Philadelphia, Pa.

NORTON Electrical Instrument Co., Manchester, Conn.

PIGNOLET, Louis M., 78 Cortlandt St., New York, N. Y.

QUEEN-GRAY Co., 616-18 Chestnut St., Philadelphia, Pa.

RELIANCE Instrument Co., 1135 Van Buren St., Chicago, Ill.

ROLLER-SMITH Co., 208-05 Broadway, New York, N. Y.

TROY Electrical Co., River & State Sts., Troy, N. Y.

WAGNER Electric Mfg. Co., 6400 Plymouth Ave., St. Louis, Mo.

WESTERN Electric Co., 463 West St., New York, N. Y.

WESTON Electrical Instrument Co. (Waverly Park), Newark, N. J.
(See page 73.)

ANNUNCIATORS

AUTOMOBILE ANNUNCIATORS

(For signaling from passenger to driver. For Speaking Tubes—See Tubes, Speaking. For Limousine Telephones—See Telephones, Limousine)

COWLES & Co., C., New Haven, Conn.
(See page 87.)

HOLT & Beebee Co., 51 Chardon St., Boston, Mass.

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y.
(See page 87.)

ANTI-RATTLERS

DOOR ANTI-RATTLERS

COLE, Frank, 162 Perry St., Pontiac, Mich.

GOUIN Co., L. J., 14 Roosevelt Ave., Poughkeepsie, N. Y.

N. E. Auto Door Bumper Co., Rindge Ave. (N. Cambridge), Cambridge, Mass.

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y.
(See page 87.)

ASBESTOS

SHEET ASBESTOS

(For Asbestos Packing—See Packing, Asbestos)

AMBESCO—See American Asbestos Co.

AMERICAN Asbestos Co., Norristown, Pa. "Ambesco."
(See page 77.)

CAREY Co., Philip (Lockland), Cincinnati, O.

J-M—See Johns-Manville Co.

JOHNS-MANVILLE Co., H. W., Madison Ave. & 41st St., New York, N. Y. "J-M."

KEASBEY & Mattison Co., Ambler, Pa.

NATIONAL Asbestos Co., Lena & Armat Sts. (Germantown), Philadelphia, Pa.

WATSON Co., H. F., Erie, Pa.

AXLES

FRONT AXLES

AMERICAN Ball-Bearing Co., Cleveland, O.
(See page 51.)

AMERICAN Gear & Mfg. Co., S. Park Ave., Jackson, Mich.

BILLINGS & Spencer Co., Hartford, Conn.

DRIGGS-SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

DUNLAP Mfg. Co., Columbus, O.

E.-C. Sales Co., Postal Telegraph Bldg., Chicago, Ill.

GILL & Sons Forge & Machine Works, P. H., Lorraine & Otsego Sts., Brooklyn, N. Y.
(See page 175.)

GREENVILLE Steel Car Co., Greenville, Pa.

HESS Spring & Axle Co., Carthage, O.

HIGGINS Spring & Axle Co., 1314 16th St., Racine, Wis.
(See page 395.)

HOUK Mfg. Co., Buffalo, N. Y.

JACOBSON Machine Mfg. Co., Warren, Pa.
(See page 345.)

LIGGETT Spring & Axle Co., Monongahela, Pa.
(See page 129.)

METAL Products Co., Detroit, Mich.
(See page 509.)

MOTT Wheel Works, Utica, N. Y.
(See page 453.)

Complete Index to Classification appears on Pages 8 to 26.

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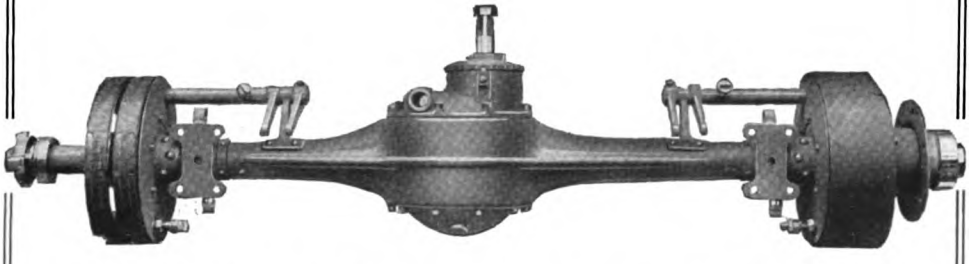
The Foremost Cars of America

Owe their smooth running and long life largely to

American Axles



¶ Practically all the important improvements in axle construction on American-made cars were first developed and introduced by makers of *American* Axles.

¶ *American* Axles lead all others on Electrics and the best of gasoline cars because *American* Axles possess, in the highest degree, the scientific accuracy demanded by the most exacting car builders.

¶ Cars not using *American* Axles are nevertheless dependent for their axle efficiency largely upon one or more of the many exclusive features originated and found at their best in *American* Axles.

¶ In *American* Axles you get the benefits of the latest important improvements—

and You Get Them First!

LICENSED UNDER THE KARDO COMPANY PATENTS

THE AMERICAN BALL-BEARING CO.

CLEVELAND, OHIO

Pioneer Axle Builders of America

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AXLES (Continued)

FRONT AXLES (Continued)

MURRAY Mfg. Co., Park Bldg., Pittsburg, Pa.

OBENBERGER Drop Forge Co., Milwaukee, Wis.
(See page 525.)

PATHFINDER—See Weaver Co.

PERU Auto Parts Mfg. Co., Peru, Ind.

RUSSEL Motor Axle Co., North Detroit, Mich.
(See page 566.)

SALISBURY Wheel & Mfg. Co., Jamestown, N. Y.
(See page 601.)

SHELDON Axle & Spring Co., Wilkes-Barre, Pa.
(See page 141.)

TIMKEN-DETROIT Axle Co., Detroit, Mich.

WALKER-WEISS Axle Co., Flint, Mich.

WEAVER Co., Geo. A., Newport, R. I. "Pathfinder."

WESTERN Spring & Axle Co., 66th St. & Van Kirk Ave., Cincinnati, O.

WESTON-MOTT Co., Flint, Mich.
(See page 411.)

YUSTER Axle Co., E. 72d St. & L. S. & M. S. Ry., Cleveland, O.
(See page 53.)

REAR AXLES

AMERICAN Ball-Bearing Co., Cleveland, O.
(See page 51.)

AMERICAN Die & Tool Co., Reading, Pa.

AMERICAN Gear & Mfg. Co., S. Park Ave., Jackson, Mich.

DETROIT Axle Co., 231-35 16th St., Detroit, Mich.

DETROIT Standard Gear Co., 742 Woodbridge St., E. Detroit, Mich.

DRIGGS-SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

DUNLAP Mfg. Co., Columbus, O.

E.-C. Sales Co., Postal Telegraph Bldg., Chicago, Ill.

EMPIRE Axle Co., Dunkirk, N. Y.
(See page 569.)

HESS Spring & Axle Co., Carthage, O.

HINDLEY Gear Co., 1105 Frankford Ave., Philadelphia, Pa.

HOUK Mfg. Co., Buffalo, N. Y.

JACOBSON Machine Mfg. Co., Warren, Pa.
(See page 345.)

KEYSTONE-HINDLEY Gear Co., Pennsylvania Bldg., Philadelphia, Pa.

LIGGETT Spring & Axle Co., Monongahela, Pa.
(See page 129.)

METAL Products Co., Detroit, Mich.
(See page 509.)

MOTT Wheel Works, Utica, N. Y.
(See page 453.)

RUSSEL Motor Axle Co., North Detroit, Mich.
(See page 566.)

SALISBURY Wheel & Mfg. Co., Jamestown, N. Y.
(See page 601.)

SHELDON Axle & Spring Co., Wilkes-Barre, Pa.
(See page 141.)

TIMKEN-DETROIT Axle Co., Detroit, Mich.

TORBENSON Gear & Axle Co., 228 High St., Newark, N. J.

WARNER Mfg. Co., Toledo, O.
(See page 243.)

WESTON-MOTT Co., Flint, Mich.
(See page 411.)

YUSTER Axle Co., E. 72d St. & L. S. & M. S. Ry., Cleveland, O.
(See page 53.)

REAR AXLES WITH TRANSMISSION

AMERICAN Gear & Mfg. Co., S. Park Ave., Jackson, Mich.

EVANS—See Merchant & Evans Co.

LINDSAY Auto Parts Co., Meridian Life Bldg., Indianapolis, Ind.

MERCHANT & Evans Co., Philadelphia, Pa. "Evans."

PERU Auto Parts Mfg. Co., Peru, Ind.

RUSSEL Motor Axle Co., North Detroit, Mich.
(See page 566.)

SALISBURY Wheel & Mfg. Co., Jamestown, N. Y.
(See page 601.)

BACKS

METAL SEAT BACKS

A-Z Co., 530 W. 56th St., New York, N. Y.

MULLINS Co., W. H., 182 Franklin St Salem, O.

BAGS

COAT RAIL BAGS

AJAX Trunk & Sample Case Co., 91-93 Mercer St., New York, N. Y.

ARSENAL Varnish Co., Rock Island, Ill.

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill.

B. E. Mfg. Co., 444 Broadway, New York, N. Y.
(See page 97.)

GILBERT Mfg. Co., New Haven, Conn.

GORDON Co., J. P., 272 N. Fourth St., Columbus, O.

NATHAN Novelty Mfg. Co., 90 G. Reade St., New York, N. Y.
(See page 209.)

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

WINSHIP, W. W., 71 Summer St., Boston, Mass.

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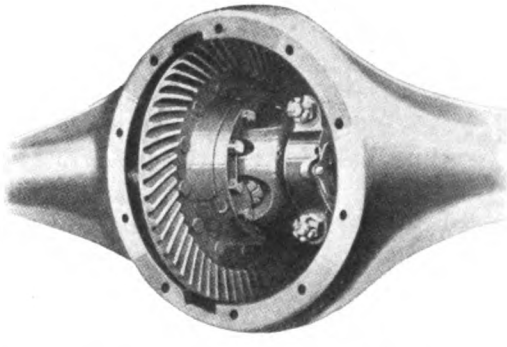
YUSTER AXLES

The Yuster Axle Company were the first manufacturers of high-grade axles to adopt and use worm bevel gears as standard equipment.

Yuster front axles travel on standard taper roller bearings.

Yuster rear axles travel on F & S annular bearings with worm bevel gears.



We claim, and are ready to prove, that we manufacture the highest grade motor car axles, in America. A modern fire-proof plant, a capacity of 15,000 sets per year, and a capable organization stand ready to co-operate and give you the very best service. Ask us for data and specifications.

THE YUSTER AXLE COMPANY

East 72nd St. & L. S. & M. S. Ry.

Cleveland, U. S. A.

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BAGS (Continued)

RUBBER GAS BAGS

AMERICAN Para Rubber Co., 6727 S. Broadway, St. Louis, Mo. "Paruco."

DAVOL Rubber Co., Providence, R. I.

DIAMOND Rubber Co., Akron, O.

GOODRICH Co., B. F., Akron, O.

INDIANA Rubber & Insulated Wire Co., Jonesboro, Ind.

MECHANICAL Rubber Co., C. & P. & Nickel Plate R. R., Cleveland, O.

PARUCO—See American Para Rubber Co.

SEAMLESS Rubber Co., New Haven, Conn.

TYER Rubber Co., Andover, Mass. "Tyrian."

TYRIAN—See Tyer Rubber Co.

TOOL BAGS OR ROLLS

(For Tool Boxes—See Boxes, Tool)

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill.

B. E. Mfg. Co., 444 Broadway, New York, N. Y.
(See page 97.)

BOYLE & Co., John, 112-14 Duane St., New York, N. Y.

CAMPBELL—See Perkins Campbell Co.

COOK & Bro., E. C., 1301-45 Carroll Ave., Chicago, Ill.

DAFOE-EUSTICE Co., Jefferson Ave. & Antoine St., Detroit, Mich. "Duk-Bak."
(See page 539.)

DUK-BAK—See Dafoe-Eustice Co.

ECONOMY Stay Co., Jefferson City, Mo.

EXCELSIOR Bag & Mfg. Co., Troy, N. Y.

FEESER Co., Frank S., 1102 Prospect St., Indianapolis, Ind. "Superior."

GILBERT Mfg. Co., New Haven, Conn.

GORDON Co., J. P., 272 N. Fourth St., Columbus, O.

HOLLIDAY & Wyon Co., West & Ohio Sts. Indianapolis, Ind.

HOPEWELL Bros., Watertown, Mass.
(See page 97.)

LANDERS Bros. Co., Dept. A, Toledo, O.
(See page 427.)

MAU-SHERWOOD Supply Co., 1616 W. Third St., Cleveland, O.

NATHAN Novelty Mfg. Co., 90 G Reade St., New York, N. Y.
(See page 209.)

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

PERKINS Campbell Co., 634 Broadway, Cincinnati, O. "Campbell."
(See page 48.)

PLANET Co., Westfield, Mass.

PREMIER Auto Novelty Mfg. Co., 375 W. Broadway, New York, N. Y.

SPRINGFIELD Harness Co., 55-61 Dwight St., Springfield, Mass.

SUPERIOR—See Feeser Co.

BALLS

STEEL BALLS

AMERICAN Ball Co., 115 Clifford St., Providence, R. I.

ATLAS Ball Co., Glenwood Ave. & Second St., Philadelphia, Pa.

AUBURN Ball Bearing Co., 27 Elisabeth St., Rochester, N. Y.
(See page 409.)

BANTAM Anti-Friction Co., Bantam, Conn. (Importers.) "H. & H."

BISMARCK—See Frasse & Co.

BRETZ Co., J. S., 250 W. 54th St., New York, N. Y. (Importers.)
(See page 469.)

D. W. F.—See Frasse & Co.

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. (Importers.) "D. W. F.," "Bismarck."
(See page 425.)

H. & H.—See Bantam Anti-Friction Co.

HOFFMAN—See R. I. V. Co.

JONES Ball Co., Arlington Heights, Mass.

NEW Departure Mfg. Co., Bristol, Conn.
(See page 61.)

PRESSED Steel Mfg. Co., Land Title Bldg., Philadelphia, Pa.

R. I. V. Co., 254 W. 57th St., New York, N. Y. (Importers.) "Hoffman."

SMITH, Edwin, Spring City, Pa.

STANDARD Roller Bearing Co., 50th St. & Lancaster Ave., Philadelphia, Pa.

BANDING

BRAKE BANDING OR LINING

(For lining brakes or clutches—See also Leather, Friction; also Belting, Leather; also Fibre, Hard)

AMBESCO—See American Asbestos Co.

AMBLER AUTOBESTOS—See Keasbey & Mattison Co.

AMERICAN Asbestos Co., Norristown, Pa. "Ambesco."
(See page 77.)

ARABIAN—See Rossendale-Reddaway Belting & Hose Co.

ASBESTOS Brake Lining Co., 1400 Broadway, New York, N. Y.

ASBESTOS & Rubber Works of America, 1790 Broadway, New York, N. Y. "Motobestos."
(See page 537.)

ASBESTOS & Rubber Works of New Jersey, Camden, N. J. "Longwear."
(See page opposite Inside Back Cover.)

AXWELL Equipment Co., 421 Wood St., Pittsburg, Pa.

BESTBESTOS—See Federal Asbestos Co.

BLUE EDGE—See Woven Steel Hose & Rubber Co.

CAMEL HAIR — See Rossendale - Reddaway Belting & Hose Co.

CAREY Co., Philip (Lockland), Cincinnati, O. "Enduro."

CHESTERTON Co., A. W., 64 India St., Boston, Mass. "Gripbestos."

CORK Insert Co., 164 Federal St., Boston, Mass.

DIAMOND N—See Norristown Magnesia & Asbestos Co.

EDKIN—See Germann Bronze Co.

ELEKTRA—See Horton Mfg. Co.

EMBESTOS—See Empire Rubber & Tire Co.

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J. "Embestos."

Complete Index to Classification appears on Pages 8 to 26.

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MULTIBESTOS REG. U.S. PAT. OFF. PAT. APPD. FOR

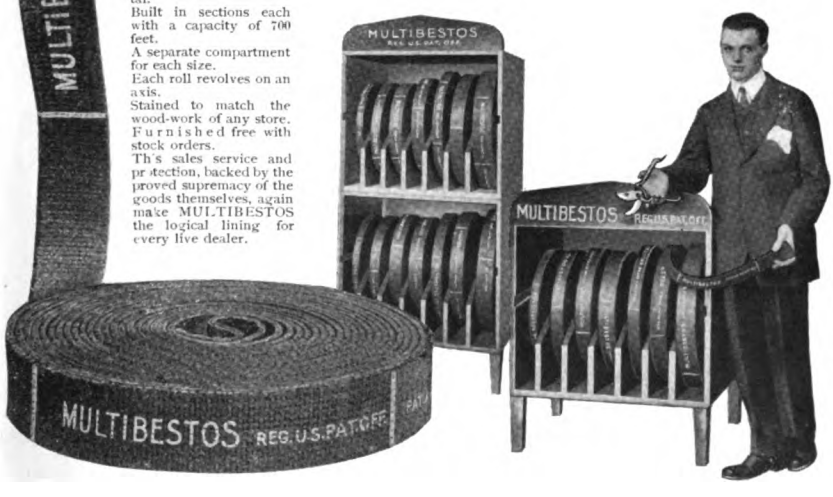
White Foot Prints Lead To Satisfaction In Brake Lining

The tests of leading engineers confirm our claims that MULTIBESTOS is to-day unequaled—a brake lining meeting every requirement of the hardest service.

Hereafter it may be distinguished by the plain white lines which run across the fabric exactly one foot apart. "White Foot Prints" we call them. They will be exclusive with MULTIBESTOS and will always identify it from other brake linings.

Not only will they afford protection to MULTIBESTOS users, but also a great saving of time and inconvenience to the men in the trade who are handling it—for the marks are spaced exactly and can be used for measurement when cutting from stock to fill orders.

The picture is good but we wish you could see the cabinets themselves—a perfect blend of the useful with the ornamental.
Built in sections each with a capacity of 700 feet.
A separate compartment for each size.
Each roll revolves on an axis.
Stained to match the wood-work of any store.
Furnished free with stock orders.
This sales service and protection, backed by the proved supremacy of the goods themselves, again make MULTIBESTOS the logical lining for every live dealer.



Standard Woven Fabric Co.

Framingham, Mass.

Sales Branches

Boston.....903 Boylston Street
Chicago.....1430 Michigan Ave.
Philadelphia.....1427 Vine St.
San Francisco....Cor. First & Howard Sts.

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BANDING (Continued)

BRAKE BANDING OR LINING (Continued)

ENDURO—See Carey Co.

ERBESTOS Brake Lining Co., 1430 Vine St., Philadelphia, Pa.

ESSEX Rubber Co., Trenton, N. J.

FEDERAL Asbestos Co., Van Houten St., Paterson, N. J. "Bestbestos," "Ford-Bestos."

FORD-BESTOS—See Federal Asbestos Co.

GANDY Belting Co., 728 W. Pratt St., Baltimore, Md.

GARCO—See General Asbestos & Rubber Co.

GENERAL Asbestos & Rubber Co., Charleston, S. C. "Garco."
(See page 245.)

GERMANN Bronze Co., 355 W. 19th St., Erie, Pa. "Edkin."
(See page 291.)

GLOBE—See United & Globe Rubber Mfg. Cos.

GRIPBESTOS—See Chesterton Co.

GRIP-ON—See New York Leather Belting Co.

HORTON Mfg. Co., F. L., 36 Whittier St., Roxbury, Mass. "Elektra."
(See page 279.)

J-M NON-BURN—See Johns-Manville Co.

JOHNS-MANVILLE Co., H. W., Madison Ave. & 41st St., New York, N. Y. "J-M Non-Burn."

KEASBEY & Mattison Co., Ambler, Pa. "Ambler Autobestos."

LONGWEAR—See Asbestos & Rubber Works of New Jersey.

MAU-SHERWOOD Supply Co., 1616 W. Third St., Cleveland, O.

MOTOBESTOS—See Asbestos & Rubber Works of America.

MULTIBESTOS—See Standard Woven Fabric Co.

NEW York Leather Belting Co., 51 Beekman St., New York, N. Y. "Grip-on."

NORRISTOWN Magnesia & Asbestos Co., Norristown, Pa. "Diamond N."

RAYBESTOS—See Royal Equipment Co.

ROSSENDALE—REDDAWAY Belting & Hose Co., Newark, N. J. "Camel Hair," "Arabian."

ROYAL Equipment Co., 1372 Bostwick Ave., Bridgeport, Conn. "Raybestos," "Stability."
(See page 85.)

RUSCO—See Russell Mfg. Co.

RUSSELL Mfg. Co., Middletown, Conn. "Rusco."

S-M-C—See Staybestos Mfg. Co.

SCANDINAVIA Belting Co., 106 Reade St., New York, N. Y.

STABILITY—See Royal Equipment Co.

STANDARD Brake Lining Co., Gleasondale, Mass.

STANDARD Woven Fabric Co., Framingham, Mass. "Multibestos."
(See page 55.)

STAYBESTOS Mfg. Co. (Germantown), Philadelphia, Pa. "S-M-C."
(See page 57.)

THERMOID Rubber Co., Trenton, N. J.
(See page 57.)

UNITED & Globe Rubber Mfg. Cos., Trenton, N. J. "Globe."

WOVEN Steel Hose & Rubber Co., Trenton, N. J. "Blue Edge."
(See page 531.)

BANDS

NON-SKID BANDS

(See also Treads, Detachable. For Tire Chains—See Chains, Tire)

BUKOLT Mfg. Co., Stevens Point, Wis. "Highway."

HIGHWAY—See Bukolt Mfg. Co.

LEATHER Tire Goods Co., Niagara Falls, N. Y. "Woodworth."
(See page 431.)

PERFECTION Non-Skid Climber Co., Edon, O.

WOODWORTH—See Leather Tire Goods Co.

BARS

ARCH BARS

(See Supports, Hood)

BASKETS

TOURING BASKETS

(See Hampers, Touring)

BATTERIES

DRY BATTERIES

ACME RAPID FIRE—See Nungesser Carbon & Battery Co.

AMERICAN Carbon & Battery Co., Signal Hill, Ill.

AMERICAN Ever Ready Co., 316 Hudson St., New York, N. Y. "Ever Ready."

AUTOCRAT—See Stackpole Carbon Co.

BLUE RIBBON—See Roche Electrical Co.

BULL DOG—See Hi-Po Waterproof Battery Co.

BULL DOG—See Western Dry Battery Co.

BURN-BOSTON Battery & Mfg. Co., 8 Doane St., Boston, Mass.

COLUMBIA—See National Carbon Co.

EASTERN—See National Carbon Co.

EVER READY—See American Ever Ready Co.

FLEUR-DE-LIS—See French Battery & Carbon Co.

FRENCH Battery & Carbon Co., Madison, Wis. "Fleur-de-Lis."

GORDON Primary Battery Co., Waterbury, Conn.

HERCULES—See National Carbon Co.

HI-PO Waterproof Battery Co., 1007 Atlantic Ave., Brooklyn, N. Y. "Bull Dog."

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THERMOID RUBBER CO., Trenton, N. J.

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BATTERIES (Continued)

DRY BATTERIES (Continued)

HI-UP—See Manhattan Electrical Supply Co.

HOT SHOT—See National Carbon Co.

J-M—See Johns-Manville Co.

JOHNS-MANVILLE Co., H. W., Madison Ave. & 41st St., New York, N. Y. "J-M."

MANHATTAN Electrical Supply Co., New York, N. Y. "Red Seal," "Hi-Up."

1900—See Nungesser Carbon & Battery Co.

NATIONAL Carbon Co., Cleveland, O. "Red Top," "Columbia," "Eastern," "Hercules," "Standby," "U. S.," "Hot Shot."

NEW STANDARD—See Roche Electrical Co.

NUE—See Union Battery Co.

NUNGESSER Carbon & Battery Co., 1170 E. 38th St., Cleveland, O. "Acme Rapid Fire," "1900."

POWER—See Union Battery Co.

READYSPARK—See U. S. Auto Battery Co.

RED SEAL—See Manhattan Electrical Supply Co.

RED SHIELD—See Wesco Supply Co.

RED STAR—See White Star Battery Co.

RED TOP—See National Carbon Co.

ROCHE Electrical Co., Wm., 487 Greenwich St., New York, N. Y. "Yates-Roche," "New Standard," "Blue Ribbon."

ROCK Island Battery Co., Winton Pl., Cincinnati, O.

STACKPOLE Carbon Co., St. Marys, Pa. "Autocrat," "Wizard."
(See page 483.)

STANDARD Carbon Co., 1151-57 Stanford Ave., Los Angeles, Cal. "Western Ignitor."

STANDBY—See National Carbon Co.

TOPNOTCH—See U. S. Auto Battery Co.

UNION Battery Co., Belleville, N. J. "Nue." "Power."

U. S.—See National Carbon Co.

U. S. Auto Battery Co., 60-62 Warren St., New York, N. Y. "Readyspark," "Top-notch."

WASHINGTON Automobile Supply Co., Washington, Ill.

WESCO Supply Co., Seventh St. & Clark Ave., St. Louis, Mo. "Red Shield."

WESTERN Dry Battery Co., 2225-31 First Ave., S., Seattle, Wash. "Bull Dog."

WESTERN Electric Co., 463 West St., New York, N. Y.

WESTERN IGNITOR—See Standard Carbon Co.

WHITE Star Battery Co., 126 Chambers St., New York, N. Y. "Red Star."

WIZARD—See Stackpole Carbon Co.

YATES-ROCHE—See Roche Electrical Co.

STORAGE BATTERIES

AMERICAN Battery Co., 1132-34 Fulton St., Chicago, Ill. "Invincible."

AMERICAN Storage Battery Co., Cambridge, Mass. "Harvard."

AMPVO Battery Co., 3031 Michigan Ave., Chicago, Ill. "Economy."

APELCO—See Apple Electric Co.

APPLE Electric Co., Newark, N. J. "Apelco."

ASHBROOK, J. F., 2639 Emmet St., Chicago, Ill. "Square," "Satisfaction."

BISON Storage Battery Co., 38 Riley St., Buffalo, N. Y.

BROWN-SMITH Battery Co., Bloomington, Ind.

COMBAT—See Commercial Battery Co.

COMMERCIAL Battery Co., 2106-10 Michigan Ave., Chicago, Ill. "Combat."

COOK Railway Signal Co., Gas & Electric Bldg., Denver, Colo. "Re Vivo."

COSMOS Electric Co., 136 Liberty St., New York, N. Y.

DETROIT Battery Co., 42 W. Larned St., Detroit, Mich.

DOTY Battery Works, R. B., 12217 Euclid Ave., Cleveland, O. "Lawrence."

DURO—See Vivax Storage Battery Co.

ECONOMY—See Ampvo Battery Co.

EDISON Storage Battery Co., 131 Lakeside Ave., Orange, N. J.
(See page 59.)

ELECTRIC Storage Battery Co., Allegheny Ave. & 19th St., Philadelphia, Pa. "Exide," "Hycap-Exide."

ELECTRIC Storage Battery & Mfg. Co., Cincinnati, O. "Hydrox."

ELECTRIC Supply & Battery Co., 7510 Woodland Ave., S. E., Cleveland, O.

ELECTRICAL Engineering & Storage Battery Co., Hume-Mansure Bldg., Sandy Hook, Conn. "Intigral."

ESSEX Storage Battery & Supply Co., 272 Halsey St., Newark, N. J.

EVEREADY Storage Battery Works of National Carbon Co., 514 W. 57th St., New York, N. Y. "Midget," "Geiszler."
(See page 233.)

EXIDE—See Electric Storage Battery Co.

FERMOILE-JOHNSON Storage Battery Co., Niagara Falls, N. Y.

FIRE FLY—See Hoosier Storage Battery Co

GEISZLER—See Eveready Storage Battery Works of National Carbon Co.

GENERAL Storage Battery Co., 2005 Locust St., St. Louis, Mo.

GOULD Storage Battery Co., 30 E. 42d St., New York, N. Y.
(See page 59.)

HARVARD—See American Storage Battery Co.

HEISSLER Storage Battery Co., 1436 Michigan Blvd., Chicago, Ill.

HELIOS—See National Carbon Co.

HOBO—See Hoosier Storage Battery Co.

HOOSIER Storage Battery Co., 214 E. Penn. St., Evansville, Ind. "Fire Fly," "Hobo."
(See page 59.)

HUDSON-FULTON—See Storage Battery Supply Co.

HYCAP-EXIDE—See Electric Storage Battery Co.

HYDROX—See Electric Storage Battery & Mfg. Co.

INTIGRAL—See Electrical Engineering & Storage Battery Co.

INVINCIBLE—See American Battery Co.

JEWEL Electric Co., 1467-69 Michigan Ave., Chicago, Ill.

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BATTERIES (Continued)

STORAGE BATTERIES (Continued)

KEELER Battery Co., 134 Ontario St., Toledo, O.

KREMLO—See McCauley Storage Battery Co.

LBA—See Willard Storage Battery Co.

L-C-R Storage Battery Co., 33 S. St. Clair St., Dayton, O.

LAWRENCE—See Doty Battery Works.

McCAULEY Storage Battery Co., 1060 St. Clair Ave., E., Cleveland, O. "Kremlo."

MARKO & Co., Paul M., 1191 Bedford Ave., Brooklyn, N. Y.
(See page 491.)

MASCO—See Milwaukee Auto Specialty Co.

MIDGET—See Eveready Storage Battery Works of National Carbon Co.

MILLER Storage Battery Co., 212 Michigan St., Toledo, O.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Radium," "Victor," "Masco."
(See page 449.)

MOUND City Battery Co., 17 S. Boyle St., St. Louis, Mo.

MULLER, Albert, Hoffman Blvd. & Hillside Ave., Jamaica, N. Y. "Porox."

MULTIPLE Storage Battery Co., 427 W. 50th St., New York, N. Y.

NATIONAL Carbon Co., Cleveland, O. "Helios."

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill.

NORTHWESTERN Storage Battery Co., Milwaukee, Wis.
(See page 235.)

PERFECTION Igniter Mfg. Co., 1175 Bedford Ave., Brooklyn, N. Y.

PERFECTION Storage Battery Co., 2023-25 S. Michigan Ave., Chicago, Ill.

PHILADELPHIA Storage Battery Co., Ontario & C Sts., Philadelphia, Pa.
(See page 501.)

POROX—See Muller, Albert.

PREMIER Electric Co., 4032-42 W. Ravenswood Ave., Chicago, Ill.

RADIUM—See Milwaukee Auto Specialty Co.

RE VIVO—See Cook Railway Signal Co.

RELIABLE—See Storage Battery Supply Co.

RELIANCE—See Storage Battery Supply Co.

REX Battery Co., 2505-09 S. State St., Chicago, Ill.

SALOM Electric Storage Battery Corp., Niagara Falls, N. Y.

SATISFACTION—See Ashbrook, J. F.

SCHUG Electric Mfg. Co., 326 Jefferson Ave., Detroit, Mich.

SERVICE Battery Co., 2325-27 Wabash Ave., Chicago, Ill.

SILVEY Electric Co., 10-16 S. Canal St., Dayton, O.

SQUARE—See Ashbrook, J. F.

STORAGE Battery Supply Co., 239 E. 27th St., New York, N. Y. "Reliance," "Reliable," "Hudson-Fulton."

SWARTZ Electric Co., The Speedway, Indianapolis, Ind.

TITAN Storage Battery Co., Chapel St. & Lister Ave., Newark, N. J.

U-S-L—See U. S. Light & Heating Co.

U. S. Light & Heating Co., Niagara Falls, N. Y. "U-S-L."
(See page 385.)

UNIVERSAL Battery Co., 3410-24 S. La Salle St., Chicago, Ill.

VESTA Accumulator Co., 2100 Indiana Ave., **Chicago, Ill.**

VICTOR—See Milwaukee Auto Specialty Co.

VIVAX Storage Battery Co., 219 E. 24th St., Chicago, Ill. "Duro."

VOLKCAR Storage Battery Co., 2441 Michigan Ave., Chicago, Ill.

WILLARD Storage Battery Co., Cleveland, O. "Lba."
(See page 523.)

WITHERBEE Igniter Co., Springfield, Mass.

ZOAR Battery Co., Zoar, O.

BEARINGS

BALL BEARINGS

(For Bearing Parts—See Balls, Steel; also Cups, Ball also Retainers, Ball)

AMERICAN Ball Co., 115 Clifford St., Providence, R. I.

AUBURN Ball Bearing Co., 27 Elizabeth St., Rochester, N. Y.
(See page 409.)

B. K. F.—See Lehman Mfg. Co.

BALL & Roller Bearing Co., Danbury, Conn.
(See page 409.)

BANTAM Anti-Friction Co., Bantam, Conn.

BARTHEL & Daly, 1790 Broadway, New York, N. Y. (Importers.) "Schafer."
(See page 275.)

BRETZ Co., J. S., 250 W. 54th St., New York, N. Y. (Importers.) "F & S"
(See page 469.)

CLEVELAND Ball Bearing Co., Cleveland, O.
(See page 409.)

D. W. F.—See Hess-Bright Mfg. Co.

F & S—See Bretz Co.

FAFNIR Bearing Co., New Britain, Conn.

G-A Ball Bearing Co., 342-44 N. Sheldon St., Chicago, Ill.

GURNEY Ball Bearing Co., Jamestown, N. Y.
(See page 479.)

H-B—See Hess-Bright Mfg. Co.

HALLMANN—See Schaeffers, Joseph.

HESS-BRIGHT Mfg. Co., Philadelphia, Pa. "H-B," "D. W. F."
(See page 67 and Front Cover.)

IMPERIAL Bearing Co., Detroit, Mich.

LEHMAN Mfg. Co., J. H., 727 Seventh Ave., New York, N. Y. (Importers.) "B. K. F."

MARBURG Bros., 1790 Broadway, New York, N. Y. (Importers.) "S. R. O."
(See page 481.)

NEW Departure Mfg. Co., Bristol, Conn.
(See page 61.)

NORMA Co. of America, 1790 Broadway, New York, N. Y. (Importers.)
(See page 63.)

R. B. F.—See Rhineland Machine Works Co.

R. I. V. Co., 254 W. 57th St., New York, N. Y. (Importers.)

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Distributors

ALBANY	Albany Hardware and Iron Co.	
ATLANTA	Elyea-Austell Co.	
BOSTON	Ahlberg Bearing Co.	93 Mass Ave.
BUFFALO	Iroquois Rubber Co.	379-383 Washington St.
CALGARY, ALB., CAN.	Chapin Company.	
CINCINNATI	Herman Bumiller Co.	432 Main St.
CHICAGO	Ahlberg Bearing Co.	2636 Michigan Ave.
	Chicago Pulley & Shafting Co.	32-36 S. Clinton St.
CLEVELAND	Ahlberg Bearing Co.	1841 Euclid Ave.
	Gray Brothers	1111 West 11th St.
DENVER	Denver Auto Goods Co.	1600 Broadway
	Fry & McGill Motor Supply Co.	1532 Broadway
	M. L. Foss	1729 California St.
DES MOINES	Herring Motor Supply Co.	912-14 Locust St.
DETROIT	Ahlberg Bearing Co.	805 Woodward Ave.
INDIANAPOLIS	Hearsey-Willis Co.	113-17 W. Market St.
KANSAS CITY, MO.	Motor and Machinists Supply Co.	1519 Grand Ave.
LOS ANGELES	Ahlberg Bearing Co.	325 W. Pico St.
	Western Rubber & Supply Co.	1011 S. Olive St.
MINNEAPOLIS	Pence Automobile Co.	800 Hennepin Ave.
NEW YORK CITY	Ahlberg Bearing Co.	1790 Broadway
	The Gwilliam Co.	Broadway and 58th St.
NORFOLK	Chemi Company.	438 Granby St.
OMAHA	The Lininger Implement Co.	1101 Sixth St.
PASADENA	Western Rubber and Supply Co.	55 W. Colo. St.
PHILADELPHIA	The Gwilliam Co.	1314 Arch St.
PITTSBURGH	Machinists Supply Co.	
PORTLAND, ME.	James Bailey Co.	18 Free St.
PORTLAND, ORE.	Ballou & Wright	Broadway and Oak St.
RICHMOND, VA.	Chemi Company	629 E. Main St.
ROCHESTER	U. S. Rubber Co.	24 Exchange St.
SACRAMENTO	Kimball-Upson Co.	609-11 K St., 603-25 Oak Ave
SAINT LOUIS	Fred Campbell	1109 Locust St.
		3219 Locust St.
SALT LAKE CITY	Bertram Motor Supply Co.	342 S. State St.
SAN DIEGO	Western Rubber and Supply Co.	1364 Fifth St.
SAN FRANCISCO	Irvin Silverberg & Co.	541 Van Ness Ave.
	Western Rubber and Supply Co.	
SEATTLE	Ballou & Wright	817 E. Pike St.
SPOKANE	Child, Day & Churchill Co.	1215 First Ave.
SYRACUSE	U. S. Rubber Co.	217 S. Clinton St.
TACOMA	Automobile Supply Co.	755 S. C St.
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BEARINGS (Continued)

BALL BEARINGS (Continued)

RHINELAND Machine Works Co., 140 W. 42d St., New York, N. Y. (Importers.) "R. B. F."

RIEBE Ball Bearing Co., 1790 Broadway, New York, N. Y. (Importers.)
(See page 507.)

SKF Ball Bearing Co., 50 Church St., New York, N. Y. (Importers.)
(See page 489.)

S.R.O.—See Marburg Bros.

SCHAEFFERS, Joseph, Marion Bldg., Cleveland, O. (Importer.) "Hallmann."

SCHAFER—See Barthel & Daly.

STANDARD Machinery Co., Auburn, R. I.
(See page 443.)

STANDARD Roller Bearing Co., 50th St. & Lancaster Ave., Philadelphia, Pa.

STAR Ball Retainer Co., Lancaster, Pa.
(See page 335.)

U. S. Ball Bearing Mfg. Co., Oak Park, Ill.
(See page 507.)

ROLLER BEARINGS

BALL & Roller Bearing Co., Danbury, Conn.
(See page 409.)

BANTAM Anti-Friction Co., Bantam, Conn

BOCK Bearing Co., Phillips Ave. & M. C. R. R., Toledo, O.
(See page 602.)

BOWER Roller Bearing Co., Detroit, Mich.
(See page 281.)

HYATT Roller Bearing Co., Detroit, Mich.
(See page 633.)

MAKUTCHAN Roller Bearing Co., McCormick Bldg., Chicago, Ill.

NORMA Co. of America, 1790 Broadway, New York, N. Y. (Importers.)
(See page 63.)

STANDARD Machinery Co., Auburn, R. I.
(See page 443.)

STANDARD Roller Bearing Co., 50th St. & Lancaster Ave., Philadelphia, Pa.

TIMKEN Roller Bearing Co., Canton, O.

REGRINDING OF BALL BEARINGS

AHLBERG Bearing Co., 2644 Michigan Ave., Chicago, Ill.
(See page 75.)

GWILLIAM Co., Broadway & 58th St., New York, N. Y.

PRUYN Ball Bearing Works, 4410 Paul St., Philadelphia, Pa.

PRUYN Co., David H., 1876 Broadway, New York, N. Y.
(See page 507.)

S. B. R. Specialty Co., 17-19 Princeton St., East Orange, N. J.

BELLS

ELECTRIC BELLS

(For warning signal in place of horn on electric cars)

COLONIAL Bell Sales Co., Cuyahoga Bldg., Cleveland, O.

DELTA-STAR Electric Co., 617-31 W. Jackson Blvd., Chicago, Ill.

EDWARDS & Co., 140th & Exterior Sts., New York, N. Y. "Recti."

LIBERTY Bell Co., 346 The Arcade, Cleveland, O.

P. R. Mfg. Co., 621 Bellevue Ave., Detroit, Mich.

RECTI—See Edwards & Co.

ROUSSEAU, David, Ossining, N. Y.

WESTERN Electric Co., 463 West St., New York, N. Y.

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AVERY Stamping Co., 5209 Lakeside Ave., Cleveland, O.

BEVIN Bros. Mfg. Co., East Hampton, Conn.

EAST Hampton Bell Co., East Hampton, Conn.

MOSSBERG Co., Frank, Attleboro, Mass.
(See page 561.)

NEW Departure Mfg. Co., Bristol, Conn.
(See page 61.)

BELTING

LEATHER BELTING

(See also Belts)

AMERICAN Belting & Tanning Co., 135 Oliver St., Boston, Mass.

AQUA—See Shultz Belting Co.

BONNER & Barnewell, 30 Church St., New York, N. Y.

BRADFORD Belting Co., 201 Walnut St., Cincinnati, O. "Monarch."

CHIBECO—See Chicago Belting Co.

CHICAGO Belting Co., 113-25 N. Green St., Chicago, Ill. "Chibeco."

CINO—See Mooney Belting Co.

COCHECO—See Williams & Sons.

COMBER—See Rahmann & Co.

ENDURMO—See Missouri Belting Co.

G & K—See Graton & Knight Mfg. Co.

GRATON & Knight Mfg. Co., Worcester, Mass. "G & K."
(See page 65.)

HOUGHTON & Co., E. F., 240 W. Somerset St., Philadelphia, Pa. "Vim."

HUDSON Belting Co., 1-3 Eaton Pl., Worcester, Mass.

JEWELL Belting Co., 55 Trumbull St., Hartford, Conn.

LADEW Co., Edward R., 82-84 Fulton St., New York, N. Y.

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"NORMA"

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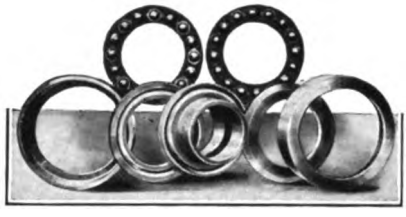
Precision
BEARINGS

Roller



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LEATHER BELTING (Continued)

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MONARCH—See Bradford Belting Co.

MOONEY Belting Co., 844 W. Sixth St., Cincinnati, O. "Cino."

NATIONAL Leather Belting Co., 342 E. 38th St., New York, N. Y.

NATIONAL Leather Mfg. Co., Niles, Mich.

NEW YORK Leather Belting Co., 51 Beekman St., New York, N. Y.

NORWICH Belt Mfg. Co., Norwich, Conn.

PAGE Belting Co., Concord, N. H.

RAHMANN & Co., Geo., 31 Spruce St., New York, N. Y. "Comber."

RHOADS & Sons, J. E., 12 N. Third St., Philadelphia, Pa. "Tannate."

SCHIEREN Co., Chas. A., 30 Ferry St., New York, N. Y.

SHULTZ Belting Co., 402 Barton St., St. Louis, Mo. "Aqua."

TANNATE—See Rhoads & Sons.

TAYLOR Belting Co., 247 S. Meridian St., Indianapolis, Ind.

VIM—See Houghton & Co.

WEATHERHEAD-THOMPSON Co., Pawtucket, R. I.

WILLIAMS & Sons, I. B., Dover, N. H. "Cocheco."

BELTS

ENDLESS FABRIC BELTS

BROPHY Belting & Supply Co., Madison, Ind.

CURRY Co., J. W., 2615 Cummins St., Cincinnati, O.

GILMER Co., L. H., 52 N. Seventh St., Philadelphia, Pa.
(See page 397.)

HINSON Co., C. & B., 2917 Webster Ave., Cincinnati, O. "Seeandbee."

LOCKWOOD & Dunlap, 1332 Addison Rd., Cleveland, O.

ROYAL Equipment Co., 1372 Bostwick Ave., Bridgeport, Conn.
(See page 85.)

RUSCO—See Russell Mfg. Co.

RUSSELL Mfg. Co., Middletown, Conn. "Rusco."

SEEANDBEE—See Hinson Co.

STANDARD Woven Fabric Co., Framingham, Mass.
(See page 55.)

GARAGE Equipment Mfg. Co., Milwaukee, Wis.
(See page 83.)

GARDNER Wire Co., 48 Race Ave. (Austin Station), Chicago, Ill. "Calcutts."

HEBB, Geo. A., 70 William St., Newark, N. J.

KELLEY, A. F., 178 S. Main St., Providence, R. I. "Kello."

KELLO—See Kelley, A. F.

MORGAN Spring Co., Worcester, Mass.

N. Y. Wire & Spring Co., 586-88 Washington St., New York, N. Y. "Bull Dog."
(See page 395.)

TRUE BLUE—See Biddison Mfg. Co.

WEBB Mfg. Co., ft. Center St., Newark, N. J.
(See page 483.)

V BELTS

(For Flat Belts—See Belting, Leather)

ALGCO—See Auburn Leather Goods Co.

AUBURN Leather Goods Co., Auburn, N. Y. "Algco."

CHIBECO—See Chicago Belting Co.

CHICAGO Belting Co., 113-25 N. Green St., Chicago, Ill. "Chibeco."

CHICAGO Rawhide Mfg. Co., 1301 Elston Ave., Chicago, Ill.

COE & Brown, 202-04 George St., New Haven, Conn.

DETROIT Leather Works, 141-43 E. Lafayette Blvd., Detroit, Mich. "Flexo."
(See page 75.)

FLEXO—See Detroit Leather Works.

GRATON & Knight Mfg. Co., Worcester, Mass. "Spartan."
(See page 65.)

HIDE, Leather & Belting Co., Indianapolis, Ind. "Wetprufe."
(See page 241.)

KONTAK—See Rahmann & Co.

MONOGRAM—See National Leather Mfg. Co.

NATIONAL Leather Belting Co., 342 E. 38th St., New York, N. Y.

NATIONAL Leather Mfg. Co., Niles, Mich. "Monogram."

PAGE Belting Co., Concord, N. H.

PEERLESS-V-BELT Co., Cedar Rapids, Ia.

RAHMANN & CO., Geo., 31 Spruce St., New York, N. Y. "Kontak."

RHOADS & Sons, J. E., 12 N. Third St., Philadelphia, Pa.

SCHIEREN Co., Chas. A., 30 Ferry St., New York, N. Y.

SPARTAN—See Graton & Knight Mfg. Co.

WAKEFIELD Sales Co., Trempealeau, Wis.

WETPRUFE—See Hide, Leather & Belting Co.

SPIRAL WIRE BELTS

BIDDISON Mfg. Co., 1516 Williamson St., Madison, Wis. "True Blue."

BULL DOG—See N. Y. Wire & Spring Co.

CALCUTTS—See Gardner Wire Co.

EUREKA Spring Co., 347 W. Broadway, New York, N. Y.

BENDINGS

WOOD BENDINGS

AMERICAN Veneer Co., 1501 Clinton St., Hoboken, N. J.

AUTO City Bow Co., 441-47 Livernois Ave., Detroit, Mich.
(See page 467.)

Complete Index to Classification appears on Pages 8 to 26.

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Auto Leathers

1851 G&K

TRADE MARK REG. U.S. PAT. OFF.

Fan Belts
Friction Leathers

Straps, Washers, Packings, etc., may seem like minor factors on your high-class product—but it's often "the little things that count."

G. & K. Auto Leathers

are quality products themselves, and belong with the high-class machines on which they are used.

We make a point of consistent quality in our Leathers, and our prices are fair. We purvey only the best—it means satisfied customers.

Send us your specifications for Leathers of any description. Samples—with prices—promptly submitted.

GRATON & KNIGHT MFG CO
Worcester Mass.

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BENDINGS (Continued)

WOOD BENDINGS (Continued)

CAMPBELL & Dann Mfg. Co., Tullahoma, Tenn.

DANN Bros. & Co., 80-88 Franklin St., New Haven, Conn.

SHEPARD & Sons, H. G., James & River Sts., New Haven, Conn.

TOLEDO Bending Co., Toledo, O.

TUCKER Wood Work Co., Sidney, O.

WHEEL & Wood Bending Co., 141 John St., Bridgeport, Conn.

BINDING

MAT AND CARPET BINDING

DOUGLAS & Lomason Co., Detroit, Mich. (See page 211.)

ENGLISH & Mersick Co., 154-60 Westchester Ave., New Haven, Conn.

BINDINGS

UPHOLSTERY BINDINGS

BACKSTAY Machine & Leather Co., Union City, Ind.

BAUER-ALDRICH Co., 363 Holden Rd., Detroit, Mich.

BAUER Bros. Mfg. Co., 1035-37 Richmond St., Cincinnati, O.

BROCKTON Stay Co., 101 Belmont St., Brockton, Mass.

CASEY Mfg. Co., 216-20 Monroe St., Detroit, Mich. (See page 467.)

CINCINNATI Welt Co., 118 Opera Pl., Cincinnati, O.

LANDERS Bros. Co., Dept. A., Toledo, O. (See page 427.)

WADE Mfg. Co., Brockton, Mass.

BLANKS

GEAR BLANKS

(See Gears, Blank)

BLOCKS

JACK LEVELING BLOCKS

GOODNOW Mfg. Co., Old South Bldg., Boston, Mass.

BOARDS

RUNNING BOARDS

(See Steps, Special)

BODIES

METAL COMMERCIAL CAR BODIES

ACME Body Co., Rahway, N. J.

ALBERT Bros., 11-13 Cannon St., New York, N. Y.

AMERICAN Body Co., 1255-63 Niagara St., Buffalo, N. Y.

ARMSTRONG-JOHNSTON Mfg. Co., W. First Ave. & Perry St., Columbus, O.

AUTO Body Co., Lansing, Mich. (See page 73.)

AUTO Metal Co., 520 Worthington St., Springfield, Mass.

BARNES-CURTISS Co., 147-49 W. 99th St., New York, N. Y.

BIEHLS Carriage Works, 31 S. Fifth St., Reading, Pa.

BOWE Carriage Co., 711 Orange St., Wilmington, Del.

BRILL Co., J. G., 62d St. & Woodland Ave., Philadelphia, Pa.

BROWN Auto-Carriage Co., 3147 Superior Ave., Cleveland, O.

BUDD Mfg. Co., Edward G., Ontario & I Sts., Philadelphia, Pa.

CAPITOL Body Co., Ray St. & Madison Ave., Indianapolis, Ind.

CENTRAL Mfg. Co., 18th St. & Georgia Ave., Connersville, Ind.

COLLINS Carriage Co., Front & Arch Sts., Camden, N. J.

COLLINS Vehicle Woodwork Co., R. N., 3900 Chouteau Ave., St. Louis, Mo.

COLYER & Co., J., 500 Central Ave., Newark, N. J.

COMMERCIAL Auto Body & Mfg. Co., 5345 St. Clair Ave., Cleveland, O.

COOLING Carriage Co., 402 French St., Wilmington, Del.

DAYTON Body Co., 618-24 Geyer St., N., Dayton, O.

EUREKA—See Lally Commercial Body Co.

HAYES-IONIA Co., Ionia, Mich.

HAYES Mfg. Co., Detroit, Mich.

HIGHLAND Body Mfg. Co. (Elmwood Place), Cincinnati, O. (See page 71.)

HUTCHCROFT & Sons Co., D. G., Cleveland, O.

IMPERIAL—See Welch & Suthergreen Co.

K-L—See Kingsbury-Leahy Co.

KAHLER Co., N. Vincennes St. & Monon R.R., New Albany, Ind.

KETTERER Co., C. P., 211-15 W. 19th St., New York, N. Y.

KEYSTONE Vehicle Co., Reading, Pa. (See page 71.)

KINGSBURY-LEAHY Co., 131-33 Hudson Ave., Albany, N. Y. "K-L." (See page 71.)

LALLY Commercial Body Co., Paris St., Everett, Mass. "Perfection," "Eureka," "Paragon."

LAWRENCE & Co., L., 292 Halsey St., Newark, N. J.

LEITCH Co., James N., Amesbury, Mass.

MECKEL, Fred L., 9-13 E. 13th St., Chicago, Ill.

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HESS-BRIGHT

HB DWF

BALL BEARINGS

DISTRIBUTORS OF HB-DWF BALL BEARINGS

Akron, Ohio, Hardware & Supply Co., 2429 W. Market St.
Albany, N. Y., Post & Lester Co., 61 Central Ave.
Allentown, Pa., Motor Accessories Co., 1111 Hamilton St.
Atlanta, Ga., Ozburn Auto Supply Co., 399 Peachtree St.
Atlantic City, N. J., The Auto Shop, 1703 Atlantic Ave.
Baltimore, Md., Auto Supply Co., 217 W. Saratoga St.
Binghamton, N. Y., R. W. Whipple, 221 Washington St.
Birmingham, Ala., Drennen Motor Car Co., Ave. C & 20th St.
Boston, Mass., Post & Lester Co., 225 Columbus Ave.
Bridgeport, Conn., Post & Lester Co., 278 Fairfield Ave.
Brooklyn, N. Y., Martin-Evans Co., 1186 Bedford Ave.
Buffalo, N. Y., James G. Barclay, Inc., 720 Main St.
Chicago, Ill., The Hess-Bright Co., 1800 Michigan Ave.
Cincinnati, Ohio, Coughlin & Davis, 7th & Walnut Sts.
Cleveland, Ohio, City Auto Tire & Sup. Co., 2353 Euclid Ave.
Columbus, Ohio, Harry E. Smith, 43 W. Broad St.
Dallas, Tex., Ferris-Dunlop Supply Co., 2029 Commerce St.
Dayton, Ohio, G. W. Shroyer & Co., Cor. 2nd & Main Sts.
Denver, Colo., Auto Equipment Co., 1552-1558 Broadway
Des Moines, Ia., Des Moines Speedo. Ser. Sta., 12th & Locust Sts.
Elmira, N. Y., Barker, Rose & Clinton Co., 109 Lake St.
Fort Wayne, Ind., Ft. Wayne Auto Sup. Co., 122 Washington Blvd. W.
Fresno, Cal., Chanslor & Lyon Co., Cor. K & Merced Sts.
Grand Rapids, Mich., Michigan Tire Co., 218 Michigan St., N. W.
Harrisburg, Pa., Front-Market Motor Sup., Front & Market Sts.
Hartford, Conn., Post & Lester Co., 112 Allyn St.
Hartford, Conn., Post & Lester Co., 175 Asylum St.
Houston, Tex., Houston Speedo. Ser. Sta. Co., 1212 Main St.
Indianapolis, Ind., Fisher Auto Co., 400 N. Capital Blvd.
Kansas City, Mo., Kansas City Auto Sup. Co., 1504 Grand Ave.
Los Angeles, Cal., Chanslor & Lyon Co., 12th St. & Grand Ave.
Louisville, Ky., Louisville Auto Sup. Co., 648 Fourth Ave.
Memphis, Tenn., Ozburn Auto Supply Co., 3rd & Monroe Sts.
Milwaukee, Wis., Milwaukee Tire & Sup. Co., 457 Milwaukee St.
Minneapolis, Minn., O. Fenstermacher, 211 S. 5th St.
Montgomery, Ala., Hobbie Motor Car Co., 222 Montgomery St.
Newark, N. J., Banister & Pollard Co., 206-208 Market St.
New Haven, Conn., Post & Lester Co., 1085 Chapel St.
New Orleans, La., Shuler Rubber & Sup. Co., 613 Baronne St.
New York, N. Y., The Hess-Bright Co., 1974 Broadway.
Oakland, Cal., Chanslor & Lyon Co.
Oklahoma City, Okla., Burwell-Smith Sup. Co., 416 N. B'way
Omaha, Nebr., Powell Supply Co., 2119 Farnam St.
Philadelphia, Pa., The Hess-Bright Co., 666 N. Broad St.
Pittsburg, Pa., Joseph Woodwell Co., 201 Wood St.
Portland, Me., Maine Motor Car Co., Free & South Sts.
Portland, Ore., Chanslor & Lyon Co., 627 Washington St.
Providence, R. I., Post & Lester Co., 174 Washington St.
Pueblo, Colo., Auto Equipment Co., 214 W. 4th St.
Richmond, Va., Dallas A. Shafer Co., 808 W. Broad St.
Rochester, N. Y., Gibaud's Roch. Auto Sup. Co., 352 Main St. E.
St. Louis, Mo., Phoenix Auto Supply Co., 3974 Olive St.
San Francisco, Cal., Chanslor & Lyon Co., 1238 Van Ness Ave.
Savannah, Ga., T. A. Bryson, 5 Perry St. E.
Scranton, Pa., Chas. B. Scott Co., 119 Franklin Ave.
Seattle, Wash., Chanslor & Lyon Co., 916 E. Pike St.
Springfield, Mass., Post & Lester Co., 270 Worthington St.
Syracuse, N. Y., Syracuse Auto Supply Co., 311 S. Warren St.
Terre Haute, Ind., John S. Cox, 222 S. 7th St.
Washington, D. C., Miller-Dudley Co., 1625 14th St. N. W.
Waterbury, Conn., Post & Lester Co., 186 Grand St.
Worcester, Mass., Post & Lester Co., 12 Mechanic St.

FOREIGN

Calgary, Alberta, Can., The Motor Car Supply Co., Ltd.
Edmonton, Alberta, Can., The Motor Car Supply Co., Ltd.
Toronto, Ontario, Can., W. R. Sachs, 134 Simcoe St.

The HESS-BRIGHT MFG. CO., Philadelphia, Pa.

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BODIES (Continued)

METAL COMMERCIAL CAR BODIES (Continued)

METROPOLITAN Auto & Carriage Co., 430-34 Grand St., Bridgeport, Conn.

MIFFLINBURG Body & Gear Co., Mifflinburg, Pa.

MONAHAN Vehicle Co., Kinsley Ave. & Eagle St., Providence, R. I.

NEW Haven Carriage Co., New Haven, Conn.
(See page 73.)

PARAGON—See Lally Commercial Body Co.

PERFECTION—See Lally Commercial Body Co.

PETERS Wagon & Auto Works, 418-20 Ensor St., Baltimore, Md.

PRESS Sons, Jacob, Fulton & Halsted Sts., Chicago, Ill.

ROBBINS & Co., Irvin, 11th & Canal Sts., Indianapolis, Ind.
(See page 71.)

SARGENT & Ham Co., 26-30 Bowker St., Boston, Mass.

SCHILDWACHTER Carriage Co., Park Ave & 128th St., New York, N. Y.

SCHNABEL & Sons, G. A., Penn Ave. & 31st St., Pittsburg, Pa.

SCHUBERT Bros. Gear Co., 43 Cedar St., Oneida, N. Y.

SPRINGFIELD Metal Body Co., Springfield, Mass.
(See page 69.)

STEWART Co., W. F., Harriet St., Flint, Mich.

TROY Mfg. Co., Troy, O.

VARIETY Mfg. Co., Sacramento & Carroll Aves., Chicago, Ill.

WALKER-WELLS Co., Amesbury, Mass.

WELCH & Suthergreen Co., 80 Lunenburg St., Fitchburg, Mass. "Imperial."

WERNER & Sons, Geo., 1133-37 Main St., Buffalo, N. Y.

WESTERN Auto-Body Mfg. Co., 416-18 E. Ninth St., Los Angeles, Cal.

WILLOUGHBY Co., Dwyer Ave. & Turner St., Utica, N. Y.

WRIGHT Carriage Body Co., Third Ave. & 24th St., Moline, Ill.

ZIMMERMAN & Sons, F. F., Main St., Waupun, Wis.

METAL PLEASURE CAR BODIES

ABRESCH Co., Chas., Fourth & Poplar Sts., Milwaukee, Wis.

ACME Body Co., Rahway, N. J.

AMERICAN Body Co., 1255-63 Niagara St., Buffalo, N. Y.

AUTO Body Co., Lansing, Mich.
(See page 73.)

AUTO Metal Co., 520 Worthington St., Springfield, Mass.

BARNES-CURTISS Co., 147-49 W. 99th St., New York, N. Y.

BEAUDETTE Co., O. J., Pontiac, Mich.

BIDDLE & Smart Co., Amesbury, Mass.

BIEHLS Carriage Works, 31 S. Fifth St., Reading, Pa.

BLUE Ribbon Auto & Carriage Co., 1720 Fairfield Ave., Bridgeport, Conn.

BOWE Carriage Co., 711 Orange St., Wilmington, Del.

BREWSTER & Co., Queensboro Bridge Plaza, Long Island City, N. Y.

BRIGGS Carriage Co., Cedar St., Amesbury, Mass.

BRIGGS Mfg. Co., Clay Ave., Detroit, Mich.

BRUNN'S Carriage Mfg. Co., 1140-48 Main St., Buffalo, N. Y.

BRUNN & Co., 980 Ellicott St., Buffalo, N. Y.

BUDD Mfg. Co., Edward G., Ontario & I Sts., Philadelphia, Pa.

CAPITOL Body Co., Ray St. & Madison Ave., Indianapolis, Ind.

CARRIAGE Woodstock Co., Owensboro, Ky.

CENTRAL Mfg. Co., 18th St. & Georgia Ave., Connersville, Ind.

CLARK Carriage Co., Amesbury, Mass.

COLLINGS Carriage Co., Front & Arch Sts., Camden, N. J.

COLLINS Vehicle Woodwork Co., R. N., 3900 Chouteau Ave., St. Louis, Mo.

COLYER & Co., J., 500 Central Ave., Newark, N. J.

COOLING Carriage Co., 402 French St., Wilmington, Del.

CUNNINGHAM Son & Co., James, 18 Canal St., Rochester, N. Y.

CURRIER-CAMERON Co., Amesbury, Mass.

CUTTER, J. Frank, 30 Amherst St., Cambridge, Mass.

DAYTON Body Co., 618-24 Geyer St., N., Dayton, O.

DEMAREST & Co., A. T., 453-67 Chapel St. New Haven, Conn.

DETROIT Body Co., Clay & St. Aubin Aves. Detroit, Mich.

DUNHAM & Son., D B., Central Ave. & Fourth St., Newark, N. J.

FARNHAM & Nelson Co., 47 Union Ave., Boston, Mass.

FISHER Body Co., St. Antoine St. & M. C. R. R., Detroit, Mich

FITZ GIBBON & Crisp, Trenton, N. J.

FLANDRAU & Co., 205 W. 75th St., New York, N. Y.

FLEETWOOD Metal Body Co., Fleetwood, Pa.

GRISWOLD Motor & Body Co., 660 Commonwealth Ave., Detroit, Mich.

HALE & Kilburn Co., 18th St., & Lehigh Ave., Philadelphia, Pa.

HASSETT & Rogers, Oak St., Amesbury Mass.

HAYES-IONIA Co., Ionia, Mich.

HAYES Mfg. Co., Detroit, Mich.

HEALEY & Co., Broadway & 51st St., New York, N. Y.

HERBERT Mfg. Co., 570 Kirby Ave., W., Detroit, Mich.

HOLBROOK Co., West End Ave. & 67th St., New York N. Y.

HOLLANDER & Morrill, Amesbury, Mass.

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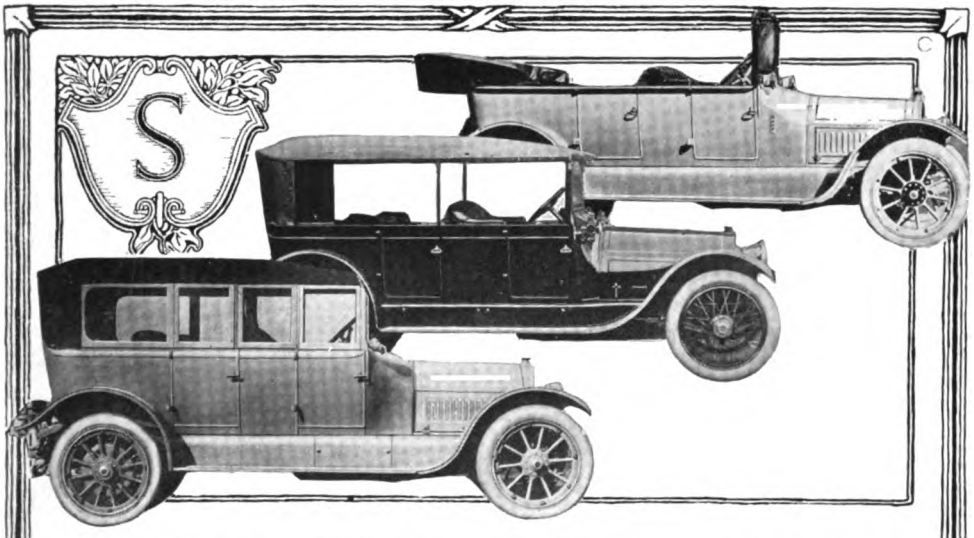

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Our development work in the past three years has been accomplished successfully—the convertible idea firmly established and the mechanical details of this type body so perfected that we are now prepared to meet the growing demand promptly with

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perfect in every detail and appointment, possessing every advantage of a closed and an open car in one. The convertible idea is so well disguised that the most fastidious buyers find nothing to criticize, especially in view of the practical advantages our new bodies give.

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This list price puts a Springfield Convertible Body within the reach of buyers of chassis from $1,000 up to about $2,250 or thereabouts. The weight, size and characteristics of this type body are in accord with the chassis it is designed to fit.

and A SPRINGFIELD CONVERTIBLE BODY
List Price $1,200

The $1,200 Springfield Convertible Body is, of course, the finest convertible body possible to build. Its weight, size and appointments are all calculated to correspond with chassis listing from $2,000 or thereabouts—or up to the highest priced.

Full information, particulars, prices, terms and discounts on single body orders or in lots upon request.

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SPRINGFIELD MASS.

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METAL PLEASURE CAR BODIES (Continued)

IRVIN Mfg. Co., R. J., Morris & Division Sts., Indianapolis, Ind.

JUDKINS Co., J. B., Merrimac, Mass.

KAHLER Co., N. Vincennes St. & Monon R. R., New Albany, Ind.

KETTERER Co., C. P., 211-15 W. 19th St., New York, N. Y.

KEYSTONE Vehicle Co., Reading, Pa. (See page 71.)

KIMBALL & Co., C. P., Chicago, Ill. (See page 87.)

KINGSBURY-LEAHY Co., 131-33 Hudson Ave., Albany, N. Y. (See page 71.)

KLINGER, Louis, 745 E. 11th St., New York, N. Y.

LAWRENCE & Co., L., 292 Halsey St., Newark, N. J.

LEITCH Co., James N., Amesbury, Mass.

LOCKE & Co., 218-20 W. 84th St., New York, N. Y.

MAC INNIS Bros., 118-22 22d St., Toledo, O.

MECKEL, Fred L., 9-13 E. 13th St., Chicago, Ill.

MIFFLINBURG Body & Gear Co., Mifflinburg, Pa.

MILBURN Wagon Co., 3134 Monroe St., Toledo, O.

MILLER Bros., Chestnut St., Amesbury, Mass.

MILLER, Hicks & Hewitt, 509-15 W. 56th St., New York, N. Y.

MONROE Body Co., Osmun St., Pontiac, Mich.

MOORE & Munger Co., 602 W. 52d St., New York, N. Y.

MOUNT Co., J. W., Maple Ave. & White St., Red Bank, N. J.

MULLINS Co., W. H., 182 Franklin St., Salem, O.

NEW HAVEN Carriage Co., New Haven, Conn. (See page 73.)

PAGE, Samuel K., 60 Franklin St., New Haven, Conn.

PETTINGELL Machine Co., 79 Elm St., Amesbury, Mass.

PORTLAND Body Works, Portland, Ind.

PULLAR Co., James, 5 Mechanic St., Hartford, Conn.

QUINBY & Co., J. M., 21-39 Division St., Newark, N. J.

R. & H. Sheet Metal Co., Abington, Mass.

RACINE Mfg. Co., Racine, Wis. (See page 341.)

REID Co., 1504 Third Ave., Moline, Ill.

RICKARDS & McLaughlin Wagon Co., Trenton, N. J.

ROBBINS & Co., Irvin, 11th & Canal Sts., Indianapolis, Ind. (See page 71.)

SARGENT & Ham Co., 26-30 Bowker St., Boston, Mass.

SCHILDWACHTER Carriage Co., Park Ave. & 128th St., New York, N. Y.

SCHNABEL & Sons, G. A., Penn Ave. & 31st St., Pittsburg, Pa.

SCHUBERT Bros. Gear Co., 43 Cedar St., Oneida, N. Y.

SEAMAN Co., W. S., 486 Virginia St., Milwaukee, Wis.

SPRINGFIELD Metal Body Co., Springfield, Mass. (See page 69.)

STEWART Co., W. F., Harriet St., Flint, Mich.

THOMPSON Co., E. J. (Forbes Field), Pittsburg, Pa.

TROY Mfg. Co., Troy, O.

UNION CITY Body Co., Union City, Ind.

WALKER Carriage Co., Merrimac, Mass. (See page 73.)

WALKER-WELLS Co., Amesbury, Mass.

WERNER & Sons, Geo., 1133-37 Main St., Buffalo, N. Y.

WESTERN Auto-Body Mfg. Co., 416-18 E. Ninth St., Los Angeles, Cal.

WILLOUGHBY Co., Dwyer Ave. & Turner St., Utica, N. Y.

WILSON Body Co., C. R., Clay Ave. & Grand Trunk R. R., Detroit, Mich.

WOOP, Wm., 42-50 W. 67th St., New York, N. Y.

WRIGHT Carriage Body Co., Third Ave. & 24th St., Moline, Ill.

WRIGHT Co., Thomas, 71-78 Colden St., Jersey City, N. J.

YORK Wagon Gear Co., York, Pa.

YOUSE Co., E. S., 46 N. Fifth St., Reading, Pa.

ZIMMERMAN & Sons, F. F., Main St., Waupun, Wis.

WOOD COMMERCIAL CAR BODIES

ACME Body Co., Rahway, N. J.

ALBERT Bros., 11-13 Cannon St., New York, N. Y.

AMERICAN Body Co., 1255-63 Niagara St., Buffalo, N. Y.

ARMSTRONG-JOHNSTON Mfg. Co., W. First Ave. & Perry St., Columbus, O.

AUBURN Wheel & Mfg. Co., Auburn, R. I.

AUTO Body Co., Lansing, Mich. (See page 73.)

AUTO Metal Co., 520 Worthington St., Springfield, Mass.

BAILEY & Bowne, Whitesboro & Wiley Sts., Utica, N. Y.

BAILY Mfg. Co., York, Pa.

BALDWIN & Son, D. W., 366 Crown St., New Haven, Conn.

BARNES-CURTISS Co., 147-49 W. 99th St., New York, N. Y.

BARRETT Mfg. Co., Peter, 111 Navy St., Brooklyn, N. Y.

BIEHLS Carriage Works, 31 S. Fifth St., Reading, Pa.

BOLLWERK & Bro., H., 3103 S. Broadway, St. Louis, Mo.

BORBEIN Auto Co., 2109-11 N. Ninth St., St. Louis, Mo.

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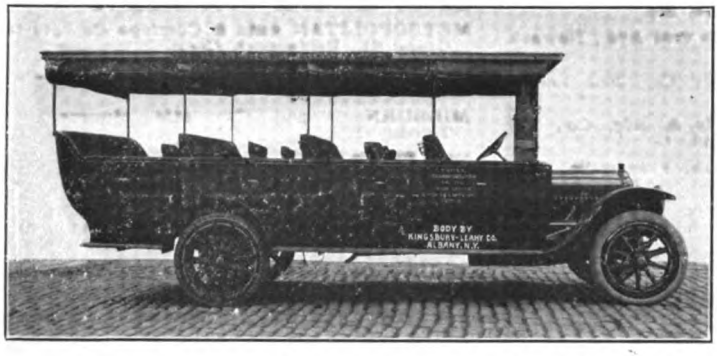

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We Also Manufacture

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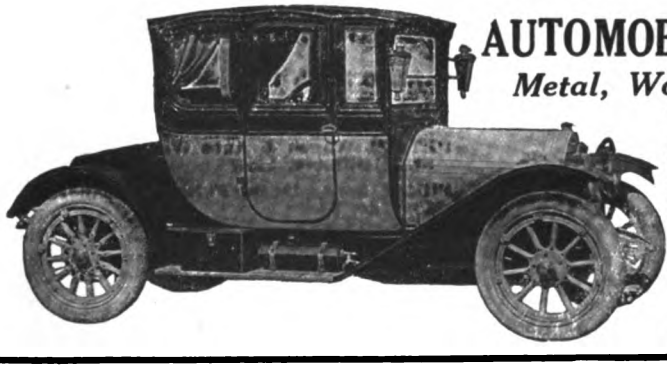
7-9-11 Jay Street
ALBANY, N. Y.



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ELMWOOD PLACE, CINCINNATI, OHIO

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BODIES (Continued)

WOOD COMMERCIAL CAR BODIES (Continued)

BOWE Carriage Co., 711 Orange St., Wilmington, Del.

BRILL Co., J. G., 62d St. & Woodland Ave., Philadelphia, Pa.

BROWN Auto-Carriage Co., 3147 Superior Ave., Cleveland, O.

BROWNELL & Burt, 12 Washington St., Taunton, Mass.

CHICAGO Carriage & Trimming Co., 1908 Indiana Ave., Chicago, Ill.

COLLINS Carriage Co., Front & Arch Sts., Camden, N. J.

COLLINS Vehicle Woodwork Co., R. N., 3900 Chouteau Ave., St. Louis, Mo.

COLYER & Co., J., 500 Central Ave., Newark, N. J.

COMMERCIAL Auto Body Co., 3003 Locust St., St. Louis, Mo.

COMMERCIAL Auto Body & Mfg. Co., 5345 St. Clair Ave., Cleveland, O.

COOLING Carriage Co., 402 French St., Wilmington, Del.

COPE Co., 1082-84 Clinton Ave., Irvington, N. J.

CURRIER-CAMERON Co., 35 Elm St., Amesbury, Mass.

DANN Bros. & Co., 80-88 Franklin St., New Haven, Conn.

DARON Co., Charles K., York, Pa.

DAYTON Body Co., 618-24 Geyer St., N., Dayton, O.

DONIGAN & Nielson, 743-47 Third Ave., Brooklyn, N. Y.

DUNHAM & Son, D. B., Central Ave. & Fourth St., Newark, N. J.

ECONOMY Mfg. Co., 207 W. South St., Indianapolis, Ind.

EUREKA—See Lally Commercial Body Co.

FISHER, A., 300-10 Fort St., W., Detroit, Mich.

FULTON-WALKER Co., 337-45 S. 12th St., Philadelphia, Pa.

GOOLD Co., James, Broadway & Schuyler St., Albany, N. Y.

HABERER & Co., Cincinnati, O.

HASSETT & Rogers, Oak St., Amesbury, Mass.

HIGHLAND Body Mfg. Co. (Elmwood Place), Cincinnati, O.
(See page 71.)

HOOVER Wagon Co., York, Pa.

IMPERIAL—See Welch & Suthergreen Co.

IRVIN Mfg. Co., R. J., Morris & Division Sts., Indianapolis, Ind.

IRVING Co., Geo., 548 W. 22d St., New York, N. Y.

JEWETT Co., Geo. H., 172-74 Shrewsbury St., Worcester, Mass.

K-L—See Kingsbury-Leahy Co.

KETTERER Co., C. P., 211-15 W. 19th St., New York, N. Y.

KEYSTONE Vehicle Co., Reading, Pa.
(See page 71.)

KIDNEY Co., James, Cincinnati, O.

KINGSBURY-LEAHY Co., 131-33 Hudson Ave, Albany, N. Y. "K-L."
(See page 71.)

KOENIG & Luhrs Wagon Co., Quincy, Ill.

LALLY Commercial Body Co., Paris St., Everett, Mass. "Perfection," "Eureka," "Paragon."

LANGE Wagon Co., H., S. St. Clair & Eva Sts., E. E., Pittsburg, Pa.

LAWRENCE & Co., L., 292 Halsey St., Newark, N. J.

LONDON Limousine Co., 112-16 Grove St., Hempstead, N. Y.

LOWELL Auto Body Co., Lowell Mich.

MECKEL, Fred L., 9-13 E. 18th St., Chicago, Ill.

MEDIA Carriage Mfg. Co., Media, Pa.

METROPOLITAN Auto & Carriage Co., 430-34 Grand St., Bridgeport, Conn.

MIFFLINBURG Body & Gear Co., Mifflinburg, Pa.

MILBURN Wagon Co., 1134 Monroe St., Toledo, O.

MILLER Co., E. M., Quincy, Ill.

MONAHAN Vehicle Co., Kinsley Ave. & Eagle St., Providence, R. I.

MOTOR Truck Body Co., 320 Franklin St., Detroit, Mich.

MOUNT Co., J. W., Maple Ave. & White St., Red Bank, N. J.

MULHOLLAND Co., Washington Ave., Dunkirk, N. Y.

NEW Haven Carriage Co., New Haven, Conn.
(See page 73.)

NIEDERHUT Carriage Co., 3556-62 Walnut St., Denver, Colo.

PARAGON—See Lally Commercial Body Co.

PERFECTION—See Lally Commercial Body Co.

PETERS Wagon & Auto Works, 418-20 Ensor St., Baltimore, Md.

PRESS Sons, Jacob, Fulton & Halsted Sts., Chicago, Ill.

RECH-MARBAKER Co., Eighth St. & Girard Ave., Philadelphia, Pa.

ROBBINS & Co., Irvin, 11th & Canal Sts., Indianapolis, Ind.
(See page 71.)

ROEDER Mfg. Co., Fred., 846-72 Grand St., Brooklyn, N. Y.

SARGENT & Ham Co., 26-30 Bowker St., Boston, Mass.

SCHAEFER Wagon Co., Gustav, 4170-80 Lorain Ave., Cleveland, O.

SCHALL, Anton, 403-07 Flushing Ave., Brooklyn, N. Y.

SCHILDWACHTER Carriage Co., Park Ave & 128th St., New York, N. Y.

SCHNABEL & Sons, G. A., Penn Ave. & 31st St., Pittsburg, Pa.

SCHUBERT Bros. Gear Co., 43 Cedar St., Oneida, N. Y.

SEBASTIAN Wagon Co., 425 E. 53d St., New York, N. Y.

SHADBOLT Mfg. Co., Flushing Ave. & Cumberland St., Brooklyn, N. Y.

SMITH Carriage Co., R. J., Lake & Lyell Aves., Rochester, N. Y.

Complete Index to Classification appears on Pages 8 to 26.

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Ammeter
for the Cowl or Dashboard

A reliable Ammeter is a necessity with electric starting and lighting systems. Motorists know this; they also recognize the superiority of Weston Instruments, the exacting standard of quality to which they must conform. This condition creates

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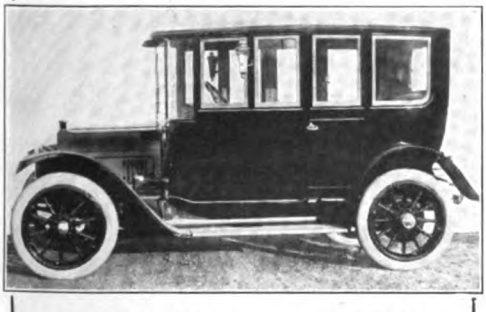
"Walker Bodies"
Metal or Wood



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Merrimac **Mass.**

NEW HAVEN CARRIAGE CO.
NEW HAVEN CONN.

Designers and Builders of High Grade Automobile Bodies

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BODIES (Continued)

WOOD COMMERCIAL CAR BODIES (Continued)

TEGETMEIER & Riepe Co., 771-73 First Ave. New York, N. Y.

TRIPPENSEE Mfg. Co., 2678 E. Grand Blvd., Detroit, Mich.

TROY Mfg. Co, Troy, O.

UHLENHAUT Bros. Wagon Co., 1322-24 Merchant St., St. Louis, Mo.

UNION Wheel Works, 51-55 Stanton St., Newark, N. J.

VALENTINE, J. S., 432-38 Princeton Ave. Trenton, N. J.

VON DOMARUS Sons Co., Geo., 847-55 Larrabee St., Chicago, Ill.

WAVERLEY Co., 139 S. East St., Indianapolis. Ind.

WEBER Co., M., 218-20 N. St. Clair St., Dayton, O.

WELCH & Suthergreen Co., 80 Lunenburg St., Fitchburg, Mass. "Imperial."

WERNER & Sons, Geo., 1133-37 Main St., Buffalo, N. Y.

WESTERN Auto-Body Mfg. Co., 416-18 E. Ninth St., Los Angeles, Cal.

WILLOUGHBY Co., Dwyer Ave. & Turner St., Utica, N. Y.

WRIGHT Carriage Body Co., Third Ave. & 24th St., Moline, Ill.

WRIGHT Co., Thomas, 71-78 Colden St., Jersey City, N. J.

YORK Carriage Co., York, Pa.

YORK Wagon Gear Co., York, Pa.

YOUSE Co., E. S., 46 N. Fifth St., Reading, Pa.

ZIMMERMAN & Sons, F. F. Main St., Waupun, Wis.

WOOD PLEASURE CAR BODIES

ABRESCH Co., Chas., Fourth & Poplar Sts., Milwaukee, Wis.

ACME Body Co., Rahway, N. J.

AMERICAN Body Co., 1255-63 Niagara St., Buffalo, N. Y.

ARMSTRONG Co., M., 433 Chapel St., New Haven, Conn.

ARMSTRONG-JOHNSTON Mfg. Co., W. First Ave. & Perry St., Columbus, O.

AUTO Body Co., Lansing, Mich. (See page 73.)

AUTO Metal Co., 520 Worthington St., Springfield, Mass.

AUTO Top & Body Co., Norristown, Pa.

BAILY Mfg. Co., York, Pa.

BARNES-CURTISS Co., 147-49 W. 99th St., New York, N. Y.

BIEHLS Carriage Works, 31 S. Fifth St., Reading, Pa.

BLUE Ribbon Auto & Carriage Co., 1720 Fairfield Ave., Bridgeport, Conn.

BORBEIN Auto Co., 2109-11 N. Ninth St., St. Louis, Mo.

BOWE Carriage Co., 711 Orange St., Wilmington, Del.

BREWSTER & Co., Queensboro Bridge Plaza, Long Island City, N. Y.

BRIGGS Carriage Co., Cedar St., Amesbury, Mass.

BROWNELL & Burt, 12 Washington St., Taunton, Mass.

BRUNN'S Carriage Mfg. Co., 1140-48 Main St., Buffalo, N. Y.

BRUNN & Co., 980 Ellicott St., Buffalo, N. Y.

CAPITOL Body Co., Ray St. & Madison Ave., Indianapolis, Ind.

CARRIAGE Woodstock Co., Owensboro, Ky.

CHICAGO Carriage & Trimming Co., 1908 Indiana Ave., Chicago, Ill.

CHICAGO Coach & Carriage Co., 1223-31 S. Michigan Ave., Chicago, Ill.

COLLINGS Carriage Co., Front & Arch Sts., Camden, N. J.

COLLINS Vehicle Woodwork Co., R. N., 3900 Chouteau Ave., St. Louis, Mo.

COLYER & Co., J., 500 Central Ave., Newark, N. J.

COOLING Carriage Co., 402 French St., Wilmington, Del.

CUNNINGHAM Son & Co., James, 18 Canal St., Rochester, N. Y.

CURRIER-CAMERON Co., 35 Elm St., Amesbury, Mass.

DANN Bros. & Co., 80-88 Franklin St., New Haven, Conn.

DAYTON Body Co., 618-24 Geyer St., N., Dayton, O.

DEMAREST & Co., A. T., 453-67 Chapel St., New Haven, Conn.

DETROIT Enclosed Body Co., Ford Bldg., Detroit, Mich.

EARL Automobile Works, 1320 S. Main St., Los Angeles, Cal.

FARNHAM & Nelson Co., 47 Union Ave., Boston, Mass.

FEHRING Carriage Co., 601-09 Third St., Columbus, Ind.

FISHER, A., 300-10 Fort St., W., Detroit Mich.

FITZ GIBBON & Crisp, Trenton, N. J.

FLANDRAU & Co., 205 W. 75th St., New York, N. Y.

GOOLD Co., James, Broadway & Schuyler St., Albany, N. Y.

GRAVES & Co., G. O., Rahway, N. J.

GREGG-WM. D. ROGERS Co., 1926 Arch St., Philadelphia, Pa.

HASSETT & Rogers, Oak St., Amesbury, Mass.

HAYES & Miller Co., 518-22 E. 57th St., New York, N. Y.

HEALEY & Co., Broadway & 51st St., New York, N. Y.

HOLCKER-ELBERG Mfg. Co., Kansas City, Mo.

HUGHEY & Son, Wm. J., 2518-20 Michigan Ave., Chicago, Ill.

HUTCHCROFT & Sons Co., D. G., Cleveland, O.

KETTERER Co., C. P., 211-15 W. 19th St., New York, N. Y.

KIMBALL & Co., C. P., Chicago, Ill. (See page 87.)

KINGSBURY-LEAHY Co., 131-33 Hudson Ave., Albany, N. Y. (See page 71.)

KLINGER, Louis, 745 E. 11th St., New York, N. Y.

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ANNULAR Ball Bearings Reground

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Universal Joint and Steering Knuckle Boots, Liners, Shims, etc., made to order.

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DETROIT, MICH.

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BODIES (Continued)

WOOD PLEASURE CAR BODIES (Continued)

LAWRENCE & Co., L., 292 Halsey St., Newark, N. J.

LIMOUSINE-CARRIAGE Mfg. Co., 3515 Michigan Ave., Chicago, Ill.

LOCKE & Co., 218-20 W. 84th St., New York, N. Y.

LOWELL Auto Body Co., Lowell, Mich.

MAC INNIS Bros., 118-22 22d St., Toledo, O.

MANHATTAN Top & Body Co., 221-23 W. 64th St., New York, N. Y.

MANN-ALDRICH Carriage Co., 1300 Lincoln St., Denver, Colo.

MAYER, John M., Kingston, N. Y.

MECKEL, Fred L., 9-13 E. 13th St., Chicago, Ill.

MEDIA Carriage Mfg. Co., Media, Pa.

MIFFLINBURG Body & Gear Co., Mifflinburg, Pa.

MONROE Body Co., Osmun St., Pontiac, Mich.

MOORE & Munger Co., 602 W. 52d St., New York, N. Y.

MOUNT Co., J. W., Maple Ave. & White St., Red Bank, N. J.

NEW Haven Carriage Co., New Haven, Conn.
(See page 73.)

PAGE, Samuel K., 60 Franklin St., New Haven, Conn.

RECH-MARBAKER Co., Eighth St. & Girard Ave., Philadelphia, Pa.

RICKARDS & McLaughlin Wagon Co., Trenton, N. J.

ROBBINS & Co., Irvin, 11th & Canal Sts., Indianapolis, Ind.
(See page 71.)

ROGERS Co., Wm. D., 1926 Arch St., Philadelphia, Pa.

SARGENT & Ham Co., 26-30 Bowker St., Boston, Mass.

SCHILDWACHTER Carriage Co., Park Ave. & 128th St., New York, N. Y.

SCHNABEL & Sons, G. A., Penn Ave. & 31st St., Pittsburg, Pa.

SCHOELER Bros., 247 Milwaukee Ave., Milwaukee, Wis.

SCHUBERT Bros. Gear Co., 43 Cedar St., Oneida, N. Y.

SHIELDS Carriage Co., 11 Carriage Ave., Amesbury, Mass.

SIEVERS & Erdman, 294-98 Jefferson Ave., Detroit, Mich.

SMITH Carriage Co., R. J., Lake & Lyell Sts., Rochester, N. Y.

STONE & Sons, C., 1658-74 Ogden Ave., Chicago, Ill.

SWAN Demountable Body Co., 4021 Payne Ave., Cleveland, O.

TERRILL Bros., Hamilton & Church Sts., Rahway, N. J.

TIERNEY, P. J., Boston Post Rd., New Rochelle, N. Y.

TROY Mfg. Co., Troy, O.

UNION City Body Co., Union City, Ind.

VALENTINE, J. S., 432-38 Princeton Ave., Trenton, N. J.

VON DOMARUS Sons Co., Geo., 847-55 Larrabee St., Chicago, Ill.

WALKER Carriage Co., Merrimac, Mass.
(See page 73.)

WALKER & Co., Alfred J., 223 W. 66th St., New York, N. Y.

WAVERLEY Co., 139 S. East St., Indianapolis, Ind.

WERNER & Sons, Geo., 1133-37 Main St., Buffalo, N. Y.

WESTERN Auto-Body Mfg. Co., 416-18 E. Ninth St., Los Angeles, Cal.

WILLOUGHBY Co., Dwyer Ave. & Turner St., Utica, N. Y.

WRIGHT Carriage Body Co., Third Ave. & 24th St., Moline, Ill.

YORK Wagon Gear Co., York, Pa.

YOUSE Co., E. S., 46 N. Fifth St., Reading, Pa.

ZIMMERMAN & Sons, F. F., Main St., Waupun, Wis.

SPECIAL DUMPING BODIES

BUDD Mfg. Co., Edward G., Ontario & I Sts., Philadelphia, Pa.

DAFFEY Bros. Motor Truck Co., San Francisco, Cal.

LALLY Commercial Body Co., Paris St., Everett, Mass.

LITTLEFORD Bros., 453-57 E. Pearl St., Cincinnati, O.

LYNCH Mfg. Co., Hammond, Ind.

MONAHAN Vehicle Co., Kinsley Ave. & Eagle St., Providence, R. I.

MOTOR Truck Body Co., 320 Franklin St., Detroit, Mich.

PRESS Sons, Jacob, Fulton & Halsted Sts., Chicago, Ill.

SHADBOLT Mfg. Co., Flushing Ave. & Cumberland St., Brooklyn, N. Y.

WRIGHT Co., Thomas, 71-78 Colden St., Jersey City, N. J.

BOILERS

AUTOMOBILE STEAM BOILERS

OFELDT & Sons, August, Valley Stream, N. Y.

OFELDT & Sons, F. W., Nyack, N. Y.

STEAM Carriage Boiler Co., 130 W. First St., Oswego, N. Y.

BOLTS

CAP BOLTS

(See Screws, Cap and Set)

CARRIAGE BOLTS

(See Bolts, Machine and Carriage)

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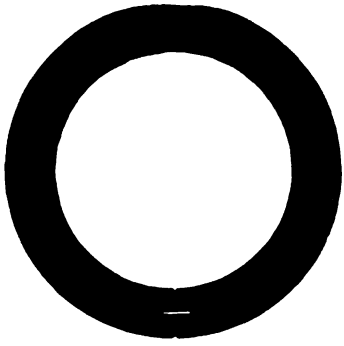

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Body Bolts
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Washers, Screws,
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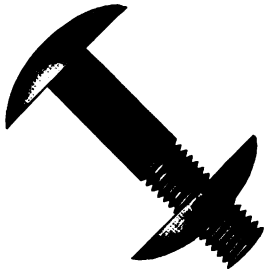

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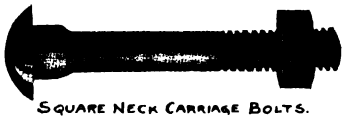


SQUARE NECK CARRIAGE BOLTS.

SCREWS — WOOD
MACHINE
COACH

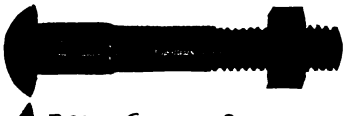
BOLTS — AUTO. WHEEL
CARRIAGE
MACHINE
STEP
STOVE
RIBBED NECK

RIVETS

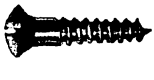
COTTERS

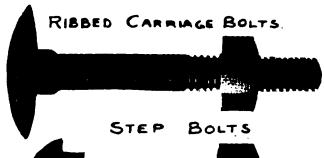
NUTS — SQUARE
HEXAGON
SEMI FINISHED
FULL FINISHED

SPRING COTTER PINS

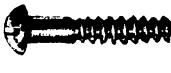


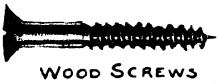
RIBBED CARRIAGE BOLTS.



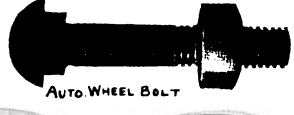


STEP BOLTS





WOOD SCREWS



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CLEVELAND, OHIO.

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BOLTS (Continued)

MACHINE AND CARRIAGE BOLTS

AMERICAN Iron & Steel Mfg. Co., Front & Cumberland Sts., Lebanon, Pa.

ANCHOR Bolt & Nut Co., Poughkeepsie, N. Y.

CLARK Bros. Bolt Co., Milldale, Conn. (See page 77.)

COLUMBUS Bolt Works, 162 W. Randolph St., Columbus, O.

DETROIT Screw Works, Detroit, Mich. (See page 347.)

FALLS Rivet Co., Kent, O.

GRAHAM Nut Co., Pittsburg, Pa.

HASKELL Mfg. Co., Wm. H., 24 Commerce St., Pawtucket, R. I.

HAYDON, A. & M., 304 N. 22d St., Philadelphia, Pa.

KANSAS City Bolt & Nut Co. (Sheffield Station), Kansas City, Mo.

KIRK-LATTY Mfg. Co., Madison Ave., Cleveland, O.

LAMSON & Sessions Co., 2188 Scranton Rd., Cleveland, O.

LANZ & Sons, Mathew, 2907 Carson St., Pittsburg, Pa.

NATIONAL Screw & Tack Co., Cleveland, O. (See page 77.)

NEW Castle Steel & Iron Co., New Castle, Pa.

OLIVER Iron & Steel Co., Pittsburg, Pa.

PAWTUCKET Mfg. Co., 327 Pine St., Pawtucket, R. I.

PITTSBURG Screw & Bolt Co., Preble Ave. (N. S.), Pittsburg, Pa.

REPUBLIC Iron & Steel Co., Republic Bldg., Youngstown, O.

RHODE Island Tool Co., Providence, R. I.

RUSSELL, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

ST. LOUIS Screw Co., Clarence & Bulwer Aves., St. Louis, Mo.

SHELTON Co., Shelton, Conn.

SKELLY Bolt Co., Thomas P., 24th & Callowhill Sts., Philadelphia, Pa.

SPRING AND SHACKLE BOLTS

BLASER—See H. & M. Screw Co.

BOWEN Mfg. Co., Auburn, N. Y. (See page 151.)

BROWN Co., 213 Bellevue Ave., Syracuse, N. Y.

CORCORAN-SEIDEL Co., Cleveland, O.

ELECTRIC Welding Products Co., Cleveland, O. (See page 597.)

H. & M. Screw Co., Fostoria, O. "Blaser."

WINKLEY Co., Detroit, Mich. (See page 149.)

ZERK Mfg. Co., Cleveland, O.

STOVE AND TIRE BOLTS

AMERICAN Screw Co., Providence, R. I.

ATLAS Bolt & Screw Co., 1289 Marquette Rd., N. E., Cleveland, O.

CLARK Bros. Bolt Co., Milldale, Conn. (See page 77.)

COLUMBUS Bolt Works, 162 W. Randolph St., Columbus, O.

FALLS Rivet Co., Kent, O.

IRELAND & Matthews Mfg. Co., 51-79 Iron St., Detroit, Mich.

KIRK-LATTY Mfg. Co., Madison Ave., Cleveland, O.

LAMSON & Sessions Co., 2188 Scranton Rd., Cleveland, O.

NATIONAL Screw & Tack Co., Cleveland, O. (See page 77.)

PAWTUCKET Mfg. Co., 327 Pine St., Pawtucket, R. I.

READING Screw Co., Norristown, Pa.

REED & Prince Mfg. Co., Duncan Ave., Worcester, Mass.

RUSSELL & Erwin Mfg. Co., 94-98 Lafayette St., New York, N. Y.

RUSSELL, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

TIRE BOLTS

(See Bolts, Stove and Tire)

BONNETS

MOTOR BONNETS

(See Hoods, Motor)

UNDER BONNETS

(See Pans, Dust)

BOOTS

MOTORISTS OVER BOOTS

FIRFELT—See Worcester Slipper Co.

GREEN Felt Shoe Co., Daniel, 110 E. 13th St., New York, N. Y.

PUTNAM & Co., A. H., 154 Maple St., Danvers, Mass.

WEINBERGER & Co., A., 112 South St., New York, N. Y.

WORCESTER Slipper Co., 360-70 Park Ave., Worcester, Mass. "Firfelt."

STEERING KNUCKLE BOOTS

(For enclosing Steering Connections and Universal Joints)

ALLEN Auto Specialty Co., 1926 Broadway, New York, N. Y. (See page 97.)

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill.

B. E. Mfg. Co., 444 Broadway, New York, N. Y. (See page 97.)

BAILEY Co., R. B., 406 W. Pico St., Los Angeles, Cal.

BAUER-LEWIS Co., 363 Holden Ave., Detroit, Mich.

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COMPLETELY MACHINED, WITH GROUND BEARINGS FOR AUTOMOBILE AND MARINE MOTORS

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CHEMICAL ANALYSIS - PHYSICAL PROPERTIES

PROMPT DELIVERIES

THE PARK DROP FORGE CO.

CLEVELAND, O.

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BOOTS (Continued)

STEERING KNUCKLE BOOTS (Continued)

CAMPBELL—See Perkins Campbell Co.

DETROIT Leather Works, 141-43 E. Lafayette Blvd., Detroit, Mich. **(See page 75.)**

ECONOMY Stay Co., Jefferson City, Mo.

GILBERT Mfg. Co., New Haven, Conn.

HAGER & Son, Chas., 244-46 E. 52d St., New York, N. Y.

HOOVER Co., W. H., New Berlin, O.

LEATHER Products Co., 2263 Spring Grove Ave., Cincinnati, O.

NATHAN Novelty Mfg. Co., 90 G. Reade St., New York, N. Y. **(See page 209.)**

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill. "Niehoff."

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

NIEHOFF—See Nemo Chemical & Specialty Mfg. Co.

PERKINS Campbell Co., 634 Broadway, Cincinnati, O. "Campbell." **(See page 48.)**

REINHOLD Belting & Supply Co., 499 Atlantic Ave., Brooklyn, N. Y.

SMITH & Son, James, 40-42 Franklin Ave., Brooklyn, N. Y.

STEVENS & Bro., A. A., 1234 Wabash Ave., Chicago, Ill.

SUTHERLAND Co., F. L., 189 Beaubien St., Detroit, Mich. **(See page 449.)**

WILEY & Son Co., Wm. H., 80 Pliny St., Hartford, Conn.

SCHERER & Co., H., Detroit, Mich.

SHEPARD & Sons, H. G., James & River Sts., New Haven, Conn.

STARR, D. H., Highland, N. Y.

TOLEDO Bending Co., Toledo, O.

UNION Bow Co., 725-35 Superior Ave., N. W., Cleveland, O.

WAYNE Spoke & Bending Works, Fort Wayne, Ind.

WHEEL & Wood Bending Co., 141 John St., Bridgeport, Conn.

BOXES

METAL BATTERY BOXES

A-Z Co., 530 W. 56th St., New York, N. Y.

DETROIT Auto Specialty Co., 909-11 Greenwood Ave., Detroit, Mich.

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O. **(See page 81.)**

HAYES Mfg. Co., Detroit, Mich.

HUNT & Dorman Mfg. Co., 2102-10 Superior Ave., N. E., Cleveland, O.

KINSEY Mfg. Co., Toledo, O. "Kinwood."

KINWOOD—See Kinsey Mfg. Co.

METAL Auto Parts Co., Industrial Bldg., Indianapolis, Ind.

MITCHELL & Son, G. F., 6501 Cedar Ave., Cleveland, O.

MOLINE Pressed Steel Co., East Moline, Ill.

NATIONAL Can Co., Detroit, Mich. **(See page 333.)**

SLY Mfg. Co., W. W., Cleveland, O.

STANDARD Steel Box Co., Bridgeville, Pa.

VICTOR Auto Parts Co., Second & Elm Sts., Cincinnati, O.

BOWS

TOP BOWS

AUTO City Bow Co., 441-47 Livernois Ave., Detroit, Mich. **(See page 467.)**

BROWN & Co., S. N., 111 Commercial St., Dayton, O.

CAMPBELL & Dann Mfg. Co., Tullahoma, Tenn.

CONESTOGA Bending Works, 545 N. Market St., Lancaster, Pa.

DANN Bros. & Co., 80-88 Franklin St., New Haven, Conn.

DELPHOS Bending Co., Delphos, O.

DETROIT Wood Pulley Co., 1331-37 Bellevue Ave., Detroit, Mich.

EMPIRE Bending Works, 110 S. Christian St., Lancaster, Pa.

LEBZETTER & Son Co., Philip, 241 N. Queen St., Lancaster, Pa.

MILLIKEN, Geo. W., Muncie, Ind.

MOSSMAN, Yarnelle & Co., Pearl St. & Maiden Lane, Fort Wayne, Ind.

WOOD BATTERY BOXES

(See also Holders, Battery)

AMERICAN Body Co., 1255-63 Niagara St., Buffalo, N. Y.

BLAKELEY, W. W., 100 Leicester Ct., Detroit, Mich.

BLISS Mfg. Co., R., Pawtucket, R. I.

CHURCHILL Cabinet Co., 2119 Churchill St., Chicago, Ill.

KARREMAN Co., Grand Rapids, Mich.

STANDARD Cabinet Mfg. Co., Peru, Ind.

WEST Box Co., F. M., 225 Liberty St., Springfield, Mass.

SPARK COIL BOXES

AUTO Body Co., Lansing, Mich. **(See page 73.)**

BLISS Mfg. Co., R., Pawtucket, R. I.

BUBECK & Guerin, 161-63 W. 18th St., New York, N. Y.

CHURCHILL Cabinet Co., 2119 Churchill St., Chicago, Ill.

KARREMAN Co., Grand Rapids, Mich.

MARON Co., Frank A., Bush Terminal, Brooklyn, N. Y.

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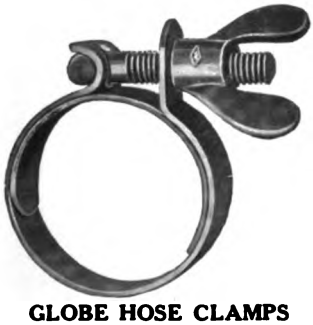

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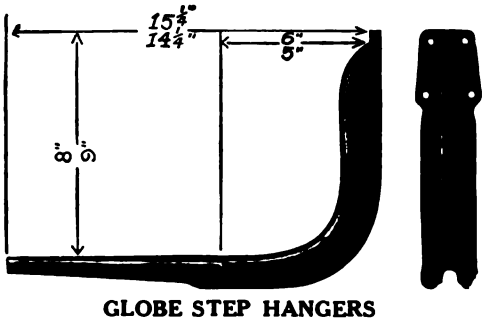

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SPARK COIL BOXES (Continued)

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WABASH Cabinet Co., Wabash, Ind.

WEST Box Co., F. M., 225 Liberty St., Springfield, Mass.

METAL TOOL BOXES

(For Tool Bags—See Bags, Tool)

A-Z Co., 530 W. 56th St., New York, N. Y.

DETROIT Auto Specialty Co., 909-11 Greenwood Ave., Detroit, Mich.

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O. (See page 81.)

GRAY Specialty Co., 148 Avon Ave., Newark, N. J.

HAYES Mfg. Co., Detroit, Mich.

KINSEY Mfg. Co., Toledo, O. "Kinwood."

KINWOOD—See Kinsey Mfg. Co.

LAWSON Co., F. H., Cincinnati, O.

METAL Auto Parts Co., Industrial Bldg., Indianapolis, Ind.

MITCHELL & Son, G. F., 6501 Cedar Ave., Cleveland, O.

MOLINE Pressed Steel Co., East Moline, Ill.

STANDARD Steel Box Co., Bridgeville, Pa.

VICTOR Auto Parts Co., Second & Elm Sts., Cincinnati, O.

WOOD TOOL BOXES

(For Tool Bags—See Bags, Tool)

AMERICAN Body Co., 1255-63 Niagara St., Buffalo, N. Y.

MARON Co., Frank A., Bush Terminal, Brooklyn, N. Y.

STANDARD Cabinet Mfg. Co., Peru, Ind.

TOLLNER'S Sons Co., Chas., Pulaski, N. Y.

WEST Box Co., F. M., 225 Liberty St., Springfield, Mass.

POUGHKEEPSIE Utilities Corp., 3840 Winnikee Ave., Poughkeepsie, N. Y. "Seeaturn."

RADIALITE—See Winona Carriage Co.

RHOADS Automobile Headlight Adjuster Co., 1720 Central Ave., Kansas City, Kans.

SEEATURN—See Poughkeepsie Utilities Corp.

SEEITALL Mfg. Co., 813 Mulberry St., Des Moines, Ia.

WINONA Carriage Co., Winona, Minn. "Radialite."

ZIMMERMAN Headlight Co., 917 E. Broadway, Louisville, Ky.

HEADLIGHT BRACKETS

CLEVELAND Hardware Co., Cleveland, O.

GARAGE Equipment Mfg Co., Milwaukee, Wis. (See page 83.)

NATIONAL Jack & Mfg. Co., 130-34 S. Clinton St., Chicago, Ill.

S. B. R. Specialty Co., 17-19 Princeton St., East Orange, N. J.

HORN BUTTON BRACKETS

(For attaching Horn Button to Steering Column)

ACME Mfg. Co., Passaic, N. J.

SIDE AND TAIL LAMP BRACKETS

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco." (See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. (See page 83.)

NATIONAL Jack & Mfg. Co., 130-34 S. Clinton St., Chicago, Ill.

SMITH & Co., Jos. N., Detroit, Mich. (See page 547.)

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. (See page 293.)

BRACKETS

AUTOMATIC HEADLIGHT BRACKETS

AUTO Protector Co., 58 Tyler St., Springfield, Mass. "Clear-Ahead."

AUTOMATIC Lamp Control Co., 418 E. First St., Dayton, O. "Dayton."

CLEAR-AHEAD—See Auto Protector Co.

DAYTON—See Automatic Lamp Control Co.

FOX Auto Searchlight Co., 78 Fountain St., Providence, R. I.

HEADLIGHT Support Co., 728 Woodward Ave., Detroit, Mich.

PETTY Dirigible Headlight Co., McIntyre Bldg., Salt Lake City, Utah.

BRAKES

ELECTRIC BRAKES

HARTFORD Suspension Co., 172 Bay St., Jersey City, N. J. (See page 513.)

EXPANDING AND CONTRACTING BRAKES

DUPLEX—See Royal Equipment Co.

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O. (See page 81.)

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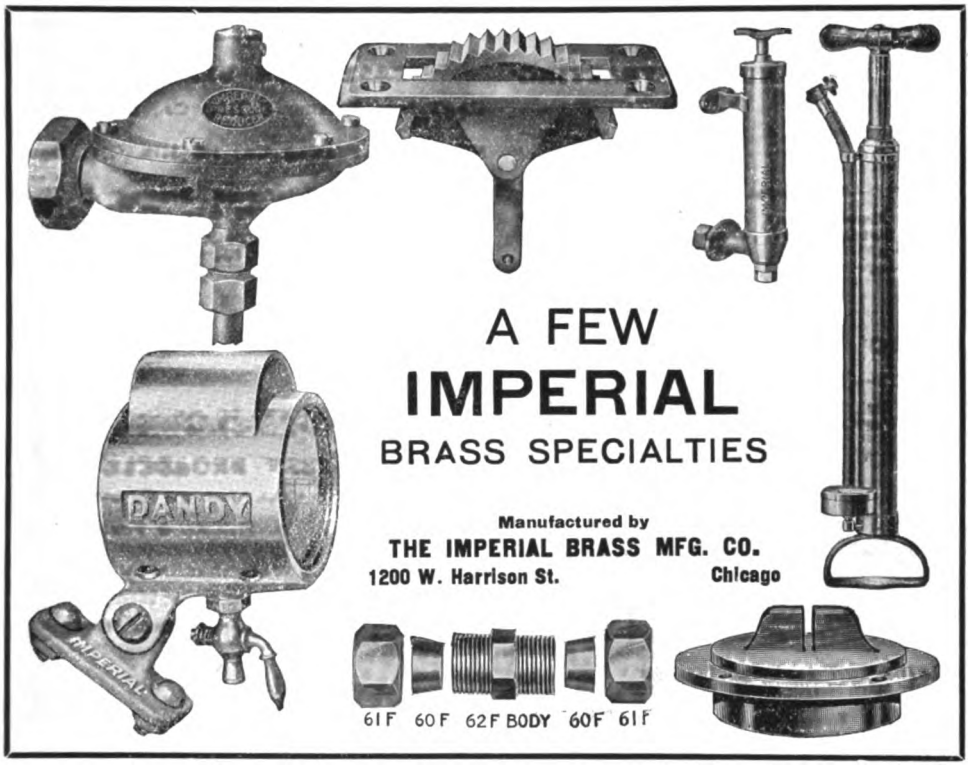

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BRAKES (Continued)

EXPANDING AND CONTRACTING BRAKES (Continued)

LIGGETT Spring & Axle Co., Monongahela, Pa.
(See page 129.)

RAYMOND—See Royal Equipment Co.

ROYAL Equipment Co., 1372 Bostwick Ave., Bridgeport, Conn. "Raymond," "Duplex."
(See page 85.)

DROP OR SPRAG BRAKES

PERFECT—See Youse Co.

YOUSE Co., E. S., 46 N. Fifth St., Reading, Pa. "Perfect."

BRASS

SHEET AND ROD BRASS AND COPPER

(For Tubing—See Tubing, Brass. For Castings—See Castings, Aluminum)

AMERICAN Brass Co. (Ansonia Brass & Copper Branch), Ansonia, Conn.

AMERICAN Brass Co. (Coe Brass Branch), Torrington, Conn.

AMERICAN Brass Co. (Benedict & Burnham Branch), Waterbury, Conn.

AMERICAN Brass Co. (Waterbury Brass Branch), 26 Crane St., Waterbury, Conn.

AMERICAN Brass Co. (Kenosha Branch), Kenosha, Wis.

BRIDGEPORT Brass Co., P. O. Station L., Bridgeport, Conn.
(See page 323.)

BUFFALO Copper & Brass Rolling Mill, Military Rd. & Hertel Ave., Buffalo, N. Y.

CHASE Rolling Mill Co., Waterbury, Conn.

DETROIT Copper & Brass Rolling Mills, Clark Ave. & Wabash R. R., Detroit, Mich.

MANHATTAN Brass Co., 328 E. 28th St., New York, N. Y.

MICHIGAN Copper & Brass Co., 1611 Jefferson Ave., W., Detroit, Mich. "Wolverine."

NEW HAVEN Copper Co., Seymour, Conn.

NEW JERSEY Tube Co., Newark, N. J.

PLUME & Atwood Mfg. Co., 470 Bank St., Waterbury, Conn.

RANDOLPH-CLOWES Co., Waterbury, Conn.

ROME Brass & Copper Co., Rome, N. Y.

SCOVILL Mfg. Co., 99 Mill St., Waterbury, Conn.

SEYMOUR Mfg. Co., Seymour, Conn.

STAMFORD German Silver Co., Stamford, Conn.

TAUNTON-NEW BEDFORD Copper Co., Taunton, Mass.

WOLVERINE—See Michigan Copper & Brass Co.

BRAZIERS

CAST IRON BRAZIERS

CAST Iron Brazing & Mfg. Co., Manchester, N. H.

NEW York Brazing Co., 196 11th Ave., New York, N. Y.

PITTSBURGH Reinforced Brazing & Machine Co., 2525 Liberty Ave., Pittsburg, Pa.

VULCAN Brazing & Machine Co., 310-12 N. 16th St., Philadelphia, Pa.
(See page 521.)

WILKES-BARRE Welding Co., 6 W. Ross St., Wilkes-Barre, Pa

BROADCLOTH

UPHOLSTERY BROADCLOTH

(See also Trimmings, Cloth and Carpet)

AMERICAN Mills Co., 17th St. & Fourth Ave., New York, N. Y.

ROY Woolen Co., Watervliet, N. Y.

SLATER & Sons, Webster, Mass.

WATERLOO Woolen Mfg. Co., Waterloo, N. Y.

BRUSHES

CARBON MOTOR BRUSHES

AMERICAN Carbon & Battery Co., Signal Hill, Ill.

JEANDRON, W. J., 172 Fulton St., New York, N. Y. (Importer.) "Le Carbone."

LE CARBONE—See Jeandron, W. J.

NATIONAL Carbon Co., Cleveland, O.

NUNGESSER Carbon & Battery Co., 1170 E. 38th St., Cleveland, O.

SPEER Carbon Co., St. Marys, Pa.

STACKPOLE Carbon Co., St. Marys, Pa.
(See page 483.)

SPARK PLUG BRUSHES

AMERICAN Wire Brush Co., 202-04 Centre St., New York, N. Y.

OSBORN Mfg. Co., 5401 Hamilton Ave., N. E., Cleveland, O.

BUCKETS

COLLAPSIBLE BUCKETS

DUPLEX—See Planet Co.

FAULTLESS—See National Mfg. Co.

GOODRICH Co., B. F., Akron, O.

GOODYEAR Rubber Co., 787 Broadway, New York, N. Y.

NATIONAL Mfg. Co., 17th & Locust Sts., Des Moines, Ia. "Faultless."

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COLLAPSIBLE BUCKETS (Continued)

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PLANET Co., Westfield, Mass. "Duplex."

WAUTO—See Pillsbury Mfg. Co.

WHITALL-TATUM Co., 42 Barclay St., New York, N. Y.

BUCKLES

STRAP BUCKLES

ANCHOR—See North & Judd Mfg. Co.

COWLES & Co., C., New Haven, Conn. (See page 87.)

CRANDAL, Stone & Co., Binghamton, N. Y. (See page 369.)

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

FRAZER & Jones Co., Syracuse, N. Y.

LYNCH Mfg. Co., Madison, Wis. (Lock.)

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

NORTH & Judd Mfg. Co., New Britain, Conn. "Anchor."

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y. (See page 87.)

WARNER Bros. Co., Bridgeport, Conn.

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

TURN-BUCKLES

(See Turn-Buckles, Wrought)

BULBS

RUBBER HORN BULBS

AMERICAN Para Rubber Co., 6727 S. Broadway, St. Louis, Mo. "Paruco."

CANFIELD Co., H. O., Bridgeport, Conn.

DAVOL Rubber Co., Providence, R. I.

GOODRICH Co., B. F., Akron, O.

MECHANICAL Rubber Co., C. & P. & Nickel Plate R. R., Cleveland, O.

PARKER, Stearns & Co., 286 Sheffield Ave., Brooklyn, N. Y.

PARUCO—See American Para Rubber Co.

PENNSYLVANIA Rubber Co., Jeannette, Pa.

SEAMLESS Rubber Co., New Haven, Conn.

TYER Rubber Co., Andover, Mass. "Tyrian."

TYRIAN—See Tyer Rubber Co.

BUMPERS

AUTOMOBILE BUMPERS

(For protecting Lamps and Radiators)

AETNA Brass Mfg. Co., 3870-90 Hamilton Ave., Cleveland, O.

AUTO Cushion Fender Co., Clinton Bldg., Columbus, O.

AUTO Parts Mfg. Co., Jackson & Michigan Sts., Milwaukee, Wis. "Badger."

BADGER—See Auto Parts Mfg. Co.

BECKLEY-RALSTON Co., Michigan Ave. & Randolph St., Chicago, Ill.

BUCKEYE—See Central Brass & Fixture Co.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O. "Buckeye," "Champion."

CHAMPION—See Central Brass & Fixture Co.

CHICAGO—See Western Brass Mfg. Works.

COMMON SENSE—See Hoover Spring Co.

COMMON SENSE—See Pratt Mfg. Co.

CONOVER—See New Jersey Tube Co.

COX Brass Mfg. Co., Albany, N. Y. "E-Z." (See page 357.)

DIAMOND—See Sager Co.

"E-Z"—See Cox Brass Mfg. Co.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Hercules," "Universal," "Gemco," "Simplex." (See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

GROSSMAN Mfg. Co., Emil, Bush Terminal, Brooklyn, N. Y.

HALLADAY Co., L. P., Dept. A., Streator, Ill. "Imperial," "Universal." (See page 359.)

HARROUN—See Turner Brass Works.

HARTFORD Suspension Co., 172 Bay St., Jersey City, N. J. (See page 513.)

HERCULES—See Garage Equipment Mfg. Co.

HERCULES—See Milwaukee Auto Engine & Supply Co.

HOOVER Spring Co., 617-37 Turk St., San Francisco, Cal. "Common Sense."

IMPERIAL—See Halladay Co.

KIMBALL & Co., C. P., Chicago, Ill. (See page 87.)

McGREGOR—See U. S. Auto Bumper Co.

MILWAUKEE Auto Engine & Supply Co., 706-08 Winnebago St., Milwaukee, Wis. "Hercules."

NATIONAL Automatic Vehicle Fender Co., 1446 N. 16th St., Omaha, Neb.

NEW JERSEY Tube Co., Newark, N. J. "Conover."

PERFECT—See Pratt Mfg. Co.

POLSON Mfg. Co., 27 Chenango St., Buffalo, N. Y.

PRATT Mfg. Co., Wm. E., 35 W. Lake St., Chicago, Ill. "Common Sense," "Perfect."

SAGER Co., J. H., 265 South Ave., Rochester, N. Y. "Diamond," "Simplex."

SIMPLEX—See Garage Equipment Co.

SIMPLEX—See Sager Co.

SMITH, H. Lund, 199-203 Paterson St., Paterson, N. J.

STANDARD Brass & Iron Works, 1820 St. Paul Ave., Milwaukee, Wis.

STAR Brass Works, 1721-23 Baltimore Ave., Kansas City, Mo.

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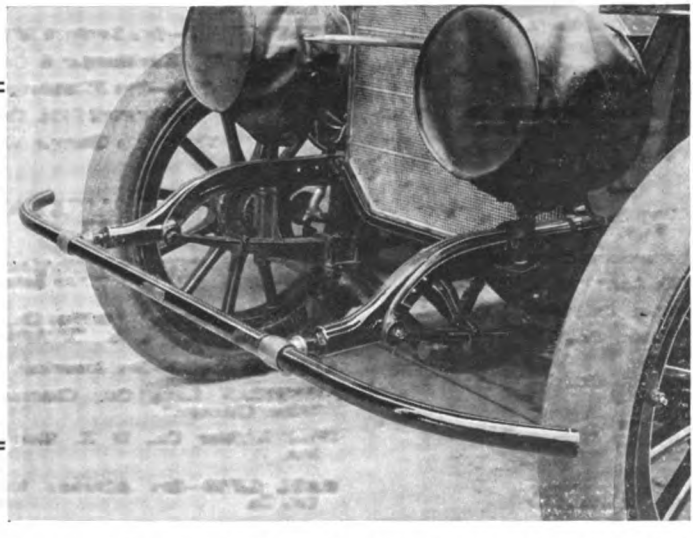

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AUTOMOBILE BUMPERS (Continued)

TURNER Brass Works, Sycamore, Ill. "Harroun."

U. S. Auto Bumper Co., 20 E. 20th St., Chicago, Ill. "McGregor."

UNIVERSAL—See Garage Equipment Mfg. Co.

UNIVERSAL—See Halladay Co.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. "Chicago."
(See page 293.)

RUBBER SPRING BUMPERS

AMERICAN Para Rubber Co., 6727 S. Broadway, St. Louis, Mo. "Paruco."

AMERICAN Tire & Rubber Co., 70-78 Beach St., Akron, O.

BOSTON Belting Co., 84 Linden Park St., Boston, Mass.

BRIDGE Web Tire Co., 2962 Prairie Ave., Chicago, Ill.

CANFIELD Co., H. O., Bridgeport, Conn.

CANFIELD Rubber Co., Bridgeport, Conn.

CENTURY—See Nemo Chemical & Specialty Mfg. Co.

CINCINNATI Rubber Mfg. Co., Cincinnati, O.
(See page 369.)

COMBINATION Rubber Mfg. Co., Bloomfield, N. J.

CONTINENTAL Rubber Works, Erie, Pa.

DIAMOND Rubber Co., Akron, O.

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J.

ESSEX Rubber Co., Trenton, N. J.

FEDERAL Rubber Mfg. Co., Milwaukee, Wis.

GOODRICH Co., B. F., Akron, O.

GOODYEAR Tire & Rubber Co., Akron, O.

MATTSON Rubber Co., Lodi, N. J.
(See page 291.)

MECHANICAL Rubber Co., C. & P. & Nickel Plate R. R., Cleveland, O.

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill. "Century."

NEW Jersey Car Spring & Rubber Co., Wayne & Brunswick St., Jersey City, N. J.

NEW York Belting & Packing Co., 91 Chambers St., New York, N. Y.

PARUCO—See American Para Rubber Co.

PENNSYLVANIA Rubber Co., Jeannette, Pa.

SEAMLESS Rubber Co., New Haven, Conn.

THERMOID Rubber Co., Trenton, N. J.
(See page 57.)

UNITED States Tire Co., Broadway & 58th St., New York, N. Y.

VOORHEES Rubber Mfg. Co., 18-46 Bostwick Ave., Jersey City, N. J.
(See page 291.)

BURNERS

ACETYLENE LAMP BURNERS

ALCO—See American Lava Co.

AMBO—See American Lava Co.

AMERICAN Lava Co., Chattanooga, Tenn. "Hela," "Alco," "De Luxe," "No-Name," "Ambo," "Hilo," "Duro," "Hexo."

AURORA—See Steward Mfg. Co.

BRAY ELTA—See Crane Co.

BRAY LUTA—See Crane Co.

BRAY RONI—See Crane Co.

CARROLL, J. B., 3057 Carroll Ave., Chicago, Ill. "Hahn."

CRANE Co., Wm. M., 16-20 W. 32d St., New York, N. Y. (Importers.) "Bray Roni," "Bray Elta," "Bray Luta."
(See page 215.)

CRESCENT—See Kirchberger & Co.

DE LUXE—See American Lava Co.

DRAKE Acetylene Burner Co., San Jose, Cal.

DURO—See American Lava Co.

HAHN—See Carroll, J. B.

HELA—See American Lava Co.

HEXO—See American Lava Co.

HILO—See American Lava Co.

KIRCHBERGER & Co., M., 374-80 Second Ave., New York, N. Y. "Crescent," "Von Schwartz," "Perfection," "Koro," "Matador," "Victory.'

KORO—See Kirchberger & Co.

LENHART Mfg. Co., 246 N. Delaware Ave., Philadelphia, Pa. "Tri-Radiant."

MATADOR—See Kirchberger & Co.

NO-NAME—See American Lava Co.

NOVELTY Burner Co., Chattanooga, Tenn. "Queen Eta."

PERFECTION—See Kirchberger & Co.

QUEEN ETA—See Novelty Burner Co.

STANDARD Acetylene Burner Co., Tasso, Tenn.

STARR—See Steward Mfg. Co.

STEWARD Mfg. Co., D. M., Chattanooga, Tenn. "Wonder," "Starr," "Aurora."

TENNESSEE Burner Mfg. Co., Chattanooga, Tenn. "X. L."

TRI-RADIANT—See Lenhart Mfg. Co.

VICTORY—See Kirchberger & Co.

VON SCHWARZ—See Kirchberger & Co.

WONDER—See Steward Mfg. Co.

X. L.—See Tennessee Burner Mfg. Co.

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ADVANCE Motor Specialties Co., 508 S. Dearborn St., Chicago, Ill. "Matchless."

ALCO CHICAGO—See American Lava Co.

AMERICAN Lava Co., Chattanooga, Tenn. "Alco Chicago."

INST Lighter Co., 59 E. Main St., Columbus, O.

MATCHLESS—See Advance Motor Specialties Co.

MORGAN Mfg. Co., John St., Newport, R. I.

PREST-O-LITE Co., 1400 Speedway, Indianapolis, Ind.
(See page 515.)

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OFELDT & Sons, F. W., Nyack, N. Y.

SIMMONS, H. C., North Burlington, Vt.

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STRYKER, C. W., 240 Shonnard St., Syracuse, N. Y.

BUTTONS

UPHOLSTERY BUTTONS

ATLAS Tack Co., Fairhaven, Mass.

COWLES & Co., C., New Haven, Conn. (See page 87.)

CRANDAL, Stone & Co., Binghamton, N. Y. (See page 369.)

HIGGIN Mfg. Co., Newport, Ky.

LANDERS Bros. Co., Dept. A., Toledo, O. (See page 427.)

LOUNSBERY & Sons, G. H., 107-09 W. Third St., Cincinnati, O.

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

MILONITE—See Morley Mfg. Co.

MORLEY Mfg. Co., 120 Boylston St., Boston, Mass. "Milonite."

NEIDER Co., F. A., Augusta, Ky.

NEW Haven Button Co., 161 Brewery St., New Haven, Conn.

READE, Chas. W., 346 Sherman Ave., New Haven, Conn.

TOCKWOTTON Co., 79 S. Main St., Providence, R. I.

UNITED Button Co., Union St., Easthampton, Mass.

WHITE Co., L. C., 214 Bank St., Waterbury, Conn.

CABLE

IGNITION CABLE

(See Wire, Insulated)

WIRE CABLE

(See Rope, Bronze Wire; also Rope, Steel Wire)

CABLES

TOP CABLES

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

CAM-SHAFTS

FINISHED OR MACHINED CAM-SHAFTS

COMMERCIAL Machine Co. 48 E. Front St., Dunkirk, N. Y.

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa. (See page 157.)

JACKSON Motor Shaft Co., Jackson, Mich. (See page 145.)

MUSKEGON Motor Specialties Co., Muskegon, Mich. (See page 91.)

PENINSULAR Auto Parts Co., 46 Lafayette Ave., E., Detroit, Mich.

WYMAN & GORDON Co., Worcester, Mass. (See Back Bone.)

CANOPIES

AUTOMOBILE CANOPIES

(See Tops, Automobile)

CANS

OILING CANS

(For Oil Guns—See Guns, Oil)

AMERICAN Tube & Stamping Co., Bridgeport, Conn.

BLOOMER, R. E., Keithsburg, Ill. "Cannon."

CANNON—See Bloomer, R. E.

CONSOLIDATED Fruit Jar Co., New Brunswick, N. J.

DELPHOS Mfg. Co., 100-24 S. Pierce St., Delphos, O.

DOVER Stamping & Mfg. Co., Cambridge, Mass. (See page 139.)

GEM Mfg. Co., 3251 Spruce St., Pittsburg, Pa.

HERO Mfg. Co., Gaul & Adams Sts., Philadelphia, Pa.

HOWLAND—See Maple City Mfg. Co.

McCLINTOCK & Irvine Co., Neville St. & P. R. R., Pittsburg, Pa.

MAPLE City Mfg. Co., Monmouth, Ill. "Howland."

NOERA Mfg. Co., Waterbury, Conn.

VOGEL & Bros., Wm., Kent Ave., Brooklyn, N. Y.

WALL Mfg. Supply Co., P., 720 Preble Ave., Pittsburg, Pa.

WILL Mfg. Co., 1742 Monadnock Blk., Chicago, Ill.

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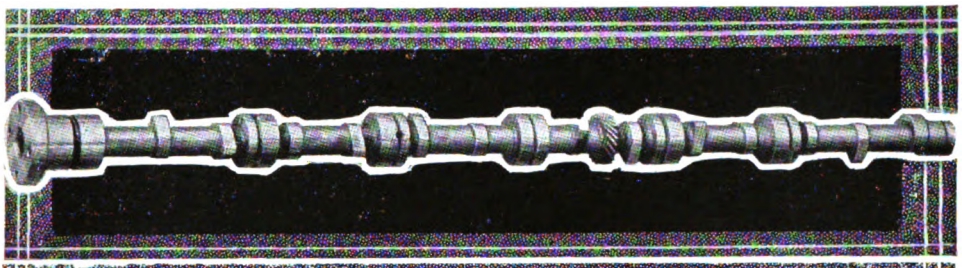

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CONCENTRATION
AND
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WE are specialists, concentrating the entire energy of our Engineering and Production Force on the manufacture of integral cam shafts. Our modern, fireproof factory and up-to-date equipment guarantee deliveries.

Experimental Cam Shafts promptly furnished

MUSKEGON MOTOR SPECIALTIES COMPANY

MUSKEGON • • • • • MICHIGAN

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CAPS

HUB CAPS

(Pressed or Stamped Caps. For Cast Caps—See Castings)

ACKLIN Stamping Co., Toledo, O.

AVERY Stamping Co., 5209 Lakeside Ave., Cleveland, O.

BOSSERT Co., Utica, N. Y.
(See page 223.)

BUFFALO Pressed Steel Co., Military Rd. & Lansing St., Buffalo, N. Y.

CROSBY Co., Buffalo, N. Y.
(See page 157.)

GIER & Dail Mfg. Co., Lansing, Mich.

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O.
(See page 81.)

HARTFORD Machine Screw Co., Hartford, Conn.
(See page 301.)

IRELAND & Matthews Mfg. Co., 51-79 Iron St., Detroit, Mich.

KONIGSLOW Mfg. Co., Otto., E. 35th St. & Perkins Ave., Cleveland, O.

LINDHOLM Metal Stamping Co., 107-15 Erie St., Camden, N. J.
(See page 151.)

OAKES Pressed Steel Co., Indianapolis, Ind.

WORCESTER Pressed Steel Co., Worcester, Mass.
(See page 157.)

MOTORISTS CAPS

ADIRONDACK—See Spear-Martin Fur Co.

AMERICAN-BUFFALO Robe Co., 1-7 Howell St., Buffalo, N. Y.

BISHOP Co., J. H., Wyandotte, Mich.

BRADLEY Knitting Co., Delevan, Wis.

DEMMERLE & Co., 116 E. 23d St., New York, N. Y.

DINNER Co., Isaac H., 694 Washington St., Boston, Mass.

FAVORITE Knitting Mills, 1388 W. Sixth St., Cleveland, O.

FORMAN & Co., E., 578 Washington St., Boston, Mass.

FREEMAN-HIRSCHSTICK Co., 227 W. Madison St., Chicago, Ill.

GILBERT Mfg. Co., New Haven, Conn.

HENDRICKSON Hat Co., A. P., 127-29 S. Meridian St., Indianapolis, Ind.

KAPLAN, Frank & Dunn, 118-15 University Pl., New York, N. Y.

LASKY & Levy, 756-60 Broadway, New York, N. Y.

MARSHALL, P. V. & E. L., 49 W. Larned St., Detroit, Mich. "Shapkes."

MORAWETZ Co., 217-25 E. Water St., Milwaukee, Wis.

PONTIAC Knitting Co., Pontiac, Mich.

REVILLON Freres, 19 W. 34th St., New York, N. Y.

SHAPKES—See Marshall, P. V. & E. L.

SPEAR-MARTIN Fur Co., 41 Church St., Burlington, Vt. "Adirondack."

SPEAR & CO., Woodhaven, N. Y.

BRASS RADIATOR CAPS

ATTWOOD Brass Works, Scribner Ave. & Bowery St., Grand Rapids, Mich.
(See page 249.)

BUSH MFG. Co., Hartford, Conn.
(See page 207.)

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

TAKE-APART-RADIATOR Co., 804 E. Washington St., Greensburg, Ind.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

RUBBER RADIATOR CAPS

AMERICAN Hard Rubber Co., 9 Mercer St., New York, N. Y.

CONDENSITE Co. of America, Belleville Ave., Glen Ridge, N. J.

GENERAL Insulate Co., 1008-14 Atlantic Ave., Brooklyn, N. Y.

LUZERNE Rubber Co., Trenton, N. J.

MECHANICAL Rubber Co., C. & P. & Nickel Plate R. R., Cleveland, O.

STOKES Rubber Co., Jos., Trenton, N. J.

CARBIDE

CALCIUM CARBIDE

AMERICAN Carbolite Sales Co., 301 S. 55th Ave., W., Duluth, Minn. "Carbolite."

CARBOLITE—See American Carbolite Sales Co.

UNION Carbide Sales Co., 122 S. Michigan Blvd., Chicago, Ill.

CARBURETERS

GASOLINE CARBURETERS

(For Mixing Valves or Vaporizers—See Vaporizers

AIR-FRICTION Carburetor Co., Dayton, O.

ATKINS Carbureter Co., Dwight, Ill.

B-D—See Detroit Motor Casting Co.

BALL SPRAY—See Shain, Chas. D.

BENNETT — See Wilcox - Bennett Carbureter Co.

BINGHAM Mfg. Co., 227 Prospect Ave., N. W., Cleveland, O. "Climax."

BOWERS—See Gilbert Mfg. Co.

BREEZE Carbureter Co., 250-52 South St., Newark, N. J.

BYRNE, Kingston & Co., 1040 Webster St., Kokomo, Ind. "Kingston."

C. R. G. Mfg. Co., 70 Devonshire St., Boston, Mass.

CARTER Carburetor Co., 912 N. Market St., St. Louis, Mo.

CLEVELAND Carbureter Co., 1232 Addison Rd., Cleveland, O.

CLIMAX—See Bingham Mfg. Co.

CRAWFORD Carburetor Co., 62 Bagg St., Detroit, Mich.

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RAYFIELD CARBURETORS

Chalmers Winton Chandler
Jeffery National Mitchell
Haynes Apperson Auburn
Paige Moon

Will You Trust the Judgment of These Manufacturers on Carburetors?

These are only a few of the manufacturers who are putting Rayfield carburetors on their cars. They do so because they are so convinced of Rayfield superiority that they prefer to pay a higher price for Rayfields than to permit their cars to be equipped with any other carburetor. You can depend upon it that every time the Rayfield is included in a car's specifications, the car is built on a quality basis alone, because the Rayfield costs more than any other carburetor.

The superior, qualities of economy, flexibility, power and speed which the Rayfield gives to the owners of these cars weighs more in the eyes of the manufacturers than the saving of a dollar or two on carburetor cost. On economy alone, the Rayfield saves to *owners* in only one month more than enough to cover its extra cost to the manufacturer.

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The customer can be sure that his interests were carefully watched when the car was built.

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1140 Michigan Ave., Chicago 1211 Woodward Ave., Detroit 1902 Broadway, New York

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CARBURETERS (Continued)

GASOLINE CARBURETERS (Continued)

CURTIS-PEMBROKE Co., 324 East Ave., Rochester, N. Y.

D. K. W.—See Duquesne Auto Accessory Co.

DALEY, Walter A., 3520 Melrose St., Chicago, Ill.

DETROIT Carbureter Co., Detroit, Mich. "E. C. B."

DETROIT Lubricator Co., Detroit, Mich. "Stewart."
(See page 231.)

DETROIT Motor Casting Co., 299-303 Beaufait Ave., Detroit, Mich. "B-D."

DUQUESNE Auto Accessory Co., New Kensington, Pa. "D. K. W."

E. C. B.—See Detroit Carbureter Co.

EXCELSIOR Needle Co., Torrington, Conn.

ESS-ESS—See Scott & Sons Co.

FINDEISEN & Kropf Mfg. Co., 2125 Rockwell St., Chicago, Ill. "Rayfield."
(See page 93.)

FLECHTER—See Trenton Brass and Machine Co.

FOLBERTH Auto Specialty Co., Lake Ave. & W. 80th St., N. W., Cleveland, O.

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill. "Vortex."

FRANKLIN Machine Co., 770 Franklin Ave., Brooklyn, N. Y.

FRITZ Carburetor Co., Swede & Penn Sts., Norristown, Pa.

G. & A. Carburetor Co., 450-52 Sixth Ave., New York, N. Y.

GARDNER Carbureter & Brass Works, Shreveport, La.

GILBERT Mfg. Co., New Haven, Conn "Bowers."

GLEASON-PETERS Air Pump Co., 255-61 Classon Ave., Brooklyn, N. Y. "Maco."

H & N Sales Co., 38-40 W. 62d St., New York, N. Y.

HAMPTON Kerosene Carburetor Co., 1876 Broadway, New York, N. Y.

HEINZE Electric Co., Lowell, Mass.
(See page 479.)

HEITGER Carbureter Co., 1127 Beecher St., Indianapolis, Ind.

HOLLEY Bros. Co., Detroit, Mich.

HOLTZER-CABOT Electric Co., Brookline, Mass. "Newcomb."

HOYT Carbureter & Automobile Co., 45 Union Ave., Boston, Mass.

HUGUELET Carbureter Co., 908 Lincoln Park Blvd., Chicago, Ill.

J-B Carburetor Corp., Main & Washington Sts., Los Angeles, Cal.

K. D. Carburetor Co., 5915 Bonna Ave., Cleveland, O.

KINGSTON—See Byrne, Kingston & Co.

KOLO Carburetor Co., 3051-57 Monroe St., Toledo, O.

KRICE Carburetor Co., McLean & Oakland Aves., Detroit, Mich.

L-A-W—See Utica Steam Gauge Co.

LIGHT Mfg. & Foundry Co., Pottstown, Pa. "Parkin."
(See page 287.)

LONGUEMARE Carburetor Co., 246 W. 59th St., New York, N. Y. (Importers.)

MACO—See Gleason-Peters Air Pump Co.

MALLEABLE Iron Fittings Co., Branford, Conn.
(See page 485.)

MARVEL Carburetor Co., Mill St., Flint, Mich.

MASTER Carburetor Corp., 944 Woodward Ave., Detroit, Mich.

MAXI Co., 216 High St., Newark, N. J.

MAYER Carburetor Co., 2673 Main St., Buffalo, N. Y.

MOSLER & Co., A. R., Box M., Mt. Vernon, N. Y.
(See page 303.)

MOTSINGER Device Mfg. Co., Lafayette, Ind.

MUIR Co., Equitable Bldg., Baltimore, Md.
(See page 95.)

MYERS Co., Arthur J., 62d St. & Broadway, New York, N. Y.

NATIONAL Auto Accessory Co., Salem Depot, N. H.

NEWCOMB—See Holtzer-Cabot Electric Co.

NORTH Chicago Machine Co., 22d St. & Commonwealth Ave., North Chicago, Ill. "Palmbla."

P R Mfg. Co., 621 Bellevue Ave., Detroit, Mich.

PALMBLA—See North Chicago Machine Co.

PARKER Carburetor Co., Charles River Rd., Cambridge, Mass.

PARKIN—See Light Mfg. & Foundry Co.

PRICE, John R., 68 Marshall St., Newark, N. J.

QUADRUPLEX—See Walker & Co.

R. O. C. Sales Co., 1777 Broadway, New York, N. Y.

RAYFIELD—See Findeisen & Kropf Mfg. Co

ROBY Carbureter Co., Indianapolis, Ind.

RUSSELL Eureka Carburetter Co., Rudd, Ia.

SCHEBLER——See Wheeler & Schebler.

SCOTT & Sons Co., Medford, Mass. "Ess-Ess."

SHAIN, Chas. D., Box 53, Station L., Brooklyn, N. Y. "Ball Spray."
(See page 509.)

SIRO Carburetor Mfg. Co., Northampton, Mass.

STEWART—See Detroit Lubricator Co.

STEWART Machine Works, Alfred C., Tenth & Santee Sts., Los Angeles, Cal.

STROMBERG Motor Devices Co., 64-68 E. 25th St., Chicago, Ill.

SUNDERMAN Safety Carburetor Corp., 2 West St., Newburgh, N. Y.

TRENTON Brass & Machine Co., Trenton, N. J. "Flechter."

UTICA Steam Gauge Co., Frankfort, N. Y. "L-A-W."

VORTEX—See Fowler Lamp & Mfg. Co.

WALKER & Co., O. S., Rockdale St., Worcester, Mass. "Quadruplex."

WEBBER & Blomquist, 11 Phillips St., Neponset, Mass.

WESTERN Motor Appliance Co., 201 Main St., Charles City, Ia.

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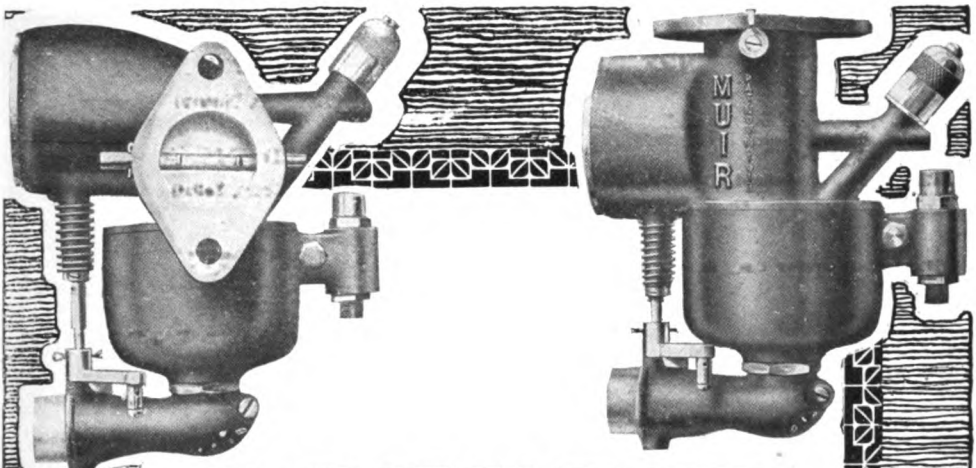

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The "Made-to-order" CARBURETOR

Before your Carburetor is expected to do the work an any given motor, an exact duplicate of that motor is placed on our testing block and put through the entire gamut of dynamometer test. When the absolutely correct mixture of air and gas is determined for every given load and speed, this data is scientifically plotted into an efficiency curve.

This efficiency curve is then transferred by our patented process to the chrome nickel steel cam which is placed within the Carburetor itself and it meters out under every condition the true proportion of air and fuel.

Such scientific accuracy has never been known before in the Carburetion field and its results have proved a revelation to automobile engineers.

We are ready and willing to give the most exact demonstration anywhere in the world, under any conditions, and before any set of judges.

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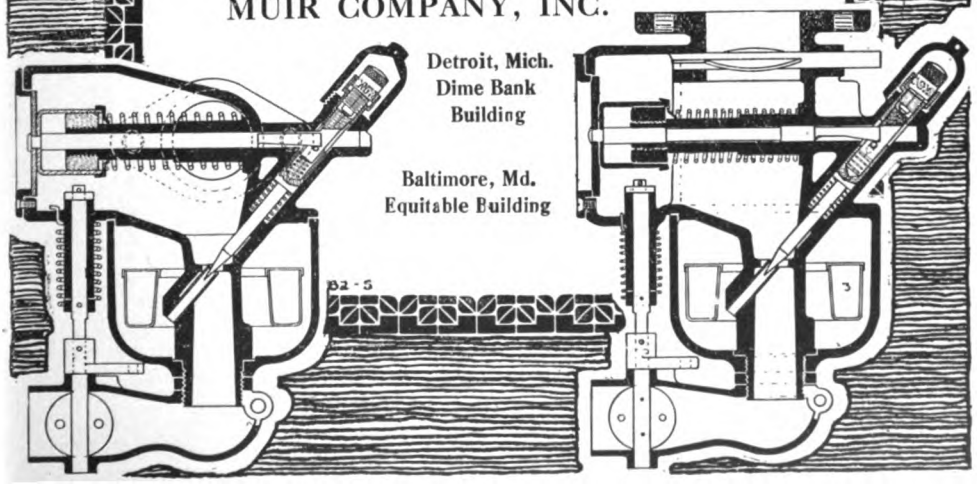

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CARBURETERS (Continued)

GASOLINE CARBURETERS (Continued)

WHEELER & Schebler, Indianapolis, Ind. "Schebler."
(See page 509.)

WHITE Bros., Mansfield, O.

WILCOX-BENNETT Carburetter Co., 1030 Marshall St., N. E., Minneapolis, Minn. "Bennett."

ZENITH Carbureter Co., ft. Vanda Ave., Detroit, Mich.

KEROSENE CARBURETERS

BARNARD Mfg. Co., 3300 Maple Ave., Los Angeles, Cal.

BENNETT—See Wilcox-Bennett Carburetter Co.

BREEZE Carbureter Co., 250-52 South St., Newark, N. J.

CAMDEN-ANCHOR Rockland Machine Co., Camden, Me. "Knox."

G. C. Vaporizer Co. of America, 1790 Broadway, New York, N. Y.

HAMPTON Kerosene Carburetor Co., 1876 Broadway, New York, N. Y.

HARROUN—See Invincible Mfg. Co.

INVINCIBLE Mfg. Co., Pittsburg, Pa. "Harroun."

K. C. B. Co., 707 Woodward Ave., Detroit, Mich.

KNOX—See Camden-Anchor Rockland Machine Co.

KOLO Carbureter Co., 3051-57 Monroe St., Toledo, O.

MASTER Carburetor Corp., 944 Woodward Ave., Detroit, Mich.

REID Perfect Appliance Co., 1926 Broadway, New York, N. Y.

RUSSELL Eureka Carburetter Co., Rudd, Ia.

SENRAB Carburetor Co., Sea Cliff, N. Y.

UNIVERSAL Oil Converter Co., 47 West St., New York, N. Y.

WESTERN Motor Appliance Co., 201 Main St., Charles City, Ia.

WHITE Bros., Mansfield, O.

WILCOX-BENNETT Carburetter Co., 1030 Marshall St., N. E., Minneapolis, Minn. "Bennett."

CASES

BATTERY CASES

(See Boxes, Battery)

CARD CASES

(See Cases, Toilet)

EXTRA LAMP BULB CASES

(Steel cases or boxes for carrying spare lamp bulbs on car).

DOVER Stamping & Mfg. Co., Cambridge, Mass.
(See page 139.)

J. & B. Mfg. Co., 65 Eagle St., Pittsfield, Mass.

MEDICAL EMERGENCY CASES

ACCIDENT Cabinet Co., Kalamazoo, Mich.

BURROUGHS, Wellcome & Co., 35-39 W. 33d St., New York, N. Y. "Tabloid."

K. W. P. Co., 907 S. Michigan St., South Bend Ind.

SHARP & Smith, 103 N. Wabash Ave., Chicago, Ill.

TABLOID—See Burroughs, Wellcome & Co.

SPARK COIL CASES

(See Boxes, Spark Coil)

SPARK PLUG CASES

(Leather cases for holding spare plugs)

ALGCO—See Auburn Leather Goods Co.

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill.

AUBURN Leather Goods Co., Auburn, N. Y. "Algco."

GORDON Co., J. P., 272 N. Fourth St., Columbus, O.

HOPEWELL Bros., Watertown, Mass.
(See page 97.)

NATHAN Novelty Mfg. Co., 906 Reade St., New York, N. Y.
(See page 209.)

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

CARPET

COACH CARPET

(See also Trimmings, Cloth and Carpet)

COCHRANE Mfg. Co., East Dedham, Mass.

DOBSON, John & James, 809 Chestnut St., Philadelphia, Pa.

HIRST-ROGER Co., Allegheny & Kensington Aves., Philadelphia, Pa.

SCHOFIELD, Mason & Co., Fairhill, Reese & Cumberland Sts., Philadelphia, Pa.

TIRE AND TUBE CASES

(For covering spare tires and tubes)

ALLEN Auto Specialty Co., 1926 Broadway, New York, N. Y.
(See page 97.)

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill. "Howard," "Chicago."

B. E. Mfg. Co., 444 Broadway, New York, N. Y.
(See page 97.)

BAILEY Co., R. B., 406 W. Pico St., Los Angeles, Cal. "Fitwell."

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THE FASTEST SELLING
TIRE and SEAT COVER
ON THE MARKET

Test of Faith—All Jobbers Stock Them

IF IT'S FABRIC

WE MAKE IT

THE B. E. MFG. CO., 444 Broadway, N. Y. C.

THE QUALITY HOUSE

The H. B. Endless Spiral Spring Tire Cover is manufactured by us to meet the great demand for a medium priced high grade tire cover.

We List Tire Covers From 90c. to $4.00.

Send For Price List.

WE GUARANTEE BEST QUALITY AND LOWEST PRICES ON TIRE COVERS.

HOPEWELL BROTHERS

WATERTOWN MASS.

The ALLEN TIRE CASE is made of finest quality enamel duck, absolutely waterproof. It gives perfect protection to the spare shoe. Made in all colors, in all sizes and for all style demountable rims and wire wheels.

Lamp Covers
Tool Box Covers
Trunk Covers
Radiator Covers
Inner Tube Bags
Knuckle Boots
Tire Locks
Tire Holders

bearing the name "Allen" are guaranteed highest quality and finest workmanship.

Tire Pressure Gauges are a motoring necessity and all dealers should carry in stock the absolutely accurate and convenient

The Allen Auto Specialty Co.
1926 Broadway New York
1627 Michigan Ave., Chicago.

ALLEN TYROMETER
TIRE PRESSURE GAUGE

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CASES (Continued)

TIRE AND TUBE CASES (Continued)

CHICAGO—See Atlas Specialty Mfg. Co.

DAFOE-EUSTICE Co., Jefferson Ave. & Antoine St., Detroit, Mich. "Duk-Bak." (See page 539.)

DIAMOND—See Gilbert Mfg. Co.

DUK-BAK—See Defoe-Eustice Co.

FALLS City Buggy Top Co., 128-30 S. Floyd St., Louisville, Ky.

FITWELL—See Bailey Co.

FITZWELL—See Niagara Fabric Mfg. Co.

FULLER Co., G. W., 182-84 Asylum St., Hartford, Conn.

GILBERT Mfg. Co., New Haven, Conn. "Diamond."

GORDON Co., J. P., 272 N. Fourth St., Columbus, O.

GREATER N. Y. Auto Cover Co., 3783 Third Ave., New York, N. Y.

H.B.—See Hopewell Bros.

HOPEWELL Bros., Watertown, Mass. "Russell," "H.B." (See page 97.)

KEYSTONE—See Nathan Novelty Mfg. Co.

HOWARD—See Atlas Specialty Mfg. Co.

IMPERIAL—See Winship, W. W.

LANDERS Bros. Co., Dept. A., Toledo, O. (See page 427.)

MERCHANT & Evans Co., Philadelphia, Pr. "Star."

NATHAN Novelty Mfg. Co., 906 Reade St., New York, N. Y. "Keystone," "Presto." (See page 209.)

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y. "Fitzwell."

PREMIER Auto Novelty Mfg. Co., 375 W. Broadway, New York, N. Y.

PRESTO—See Nathan Novelty Mfg. Co.

RUSSELL—See Hopewell Bros.

SPRINGFIELD Harness Co., 55-61 Dwight St., Springfield, Mass.

STAR—See Merchant & Evans Co.

TAYLOR Trunk Works, C. A., 39 E. Randolph St., Chicago, Ill.

WILEY & Son Co., Wm. H., 80 Pliny St., Hartford Conn.

WINSHIP, W. W., 71 Summer St., Boston, Mass. "Imperial."

TOILET AND CARD CASES

BRIDGEPORT Coach Lace Co., 1731-37 Broadway, New York, N. Y. (See page 153.)

COWLES & Co., C., New Haven, Conn. (See page 87.)

KRAFT & Sons, Theo., 458 W. Broadway, New York, N. Y.

LAW Engineering & Specialty Mfg. Co., Rochester, N. Y.

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y. (See page 87.)

PARRY & Co., A. N., Amesbury, Mass.

PERPENTE Mfg. Co., State & Wall Sts., New Haven, Conn.

RUMPP & Sons, C. F., Fifth & Cherry Sts., Philadelphia, Pa.

TAYLOR Co., H. D., 101-05 Oak St., Buffalo, N. Y.

TOOL CASES

(See Bags, Tool; also Boxes, Tool)

CASTINGS

ALUMINUM CASTINGS

A. B. C. Castings Co., 6515 Carnegie Ave., S. E., Cleveland, O.

ADAMS & Westlake Co., Chicago, Ill. "Adlake." (See page 153.)

ADLAKE—See Adams & Westlake Co.

ALLYNE—See Aluminum Castings Co.

ALUMINUM Castings Co., 6217 Carnegie Ave., Cleveland, O. "Lynite." (See page 99.)

AMERICAN Air Compressor Co., 1523-31 W. Fort St., Detroit, Mich.

AMERICAN Brass & Iron Co., Detroit, Mich. (See page 211.)

AMERICAN Bronze Co., 90-108 Arthur St., Buffalo, N. Y.

AMERICAN Castings Co., Byrket St. & L. S. & M. S. Ry., Mishawaka, Ind.

AMESBURY Brass & Foundry Co., Amesbury, Mass.

ATKINSON Co., Rochester, N. Y. (See page 261.)

ATLAS Brass Foundry Co., 980-90 S. Front St., Columbus, O.

B. G. & M. Mfg. Co., 543 N. Franklin St., Chicago, Ill.

BLAKE, Edwin J., 565 Windsor St., Hartford, Conn.

BRASS & Aluminum Foundry & Machine Co., 364 Trombly St., Detroit, Mich.

BUCKEYE Brass & Mfg. Co., 1807 Columbus Rd., Cleveland, O.

BUNTING Brass & Bronze Co., 737 Spencer St., Toledo, O. (See page 423.)

CHAMPION Brass Works, Coldwater, Mich.

CITY Brass Foundry Co., 5310 St. Clair Ave., N. E., Cleveland, O.

CONESTOGA Job & Brass Foundry, 246 N. Christian St., Lancaster, Pa.

CRAMP & Sons Ship & Engine Bldg. Co., William, Philadelphia, Pa. (See page 261.)

D'ESTE Co., Julian, 24 Canal St., Boston, Mass.

DELAWARE Brass & Aluminum Co., Muncie, Ind.

DIAMOND Brass Foundry & Machine Co., 1115 Washington Blvd., Chicago, Ill.

DORCHESTER Brass & Aluminum Foundry, Old Sturtevant Bldg. (Jamaica Plain), Boston, Mass.

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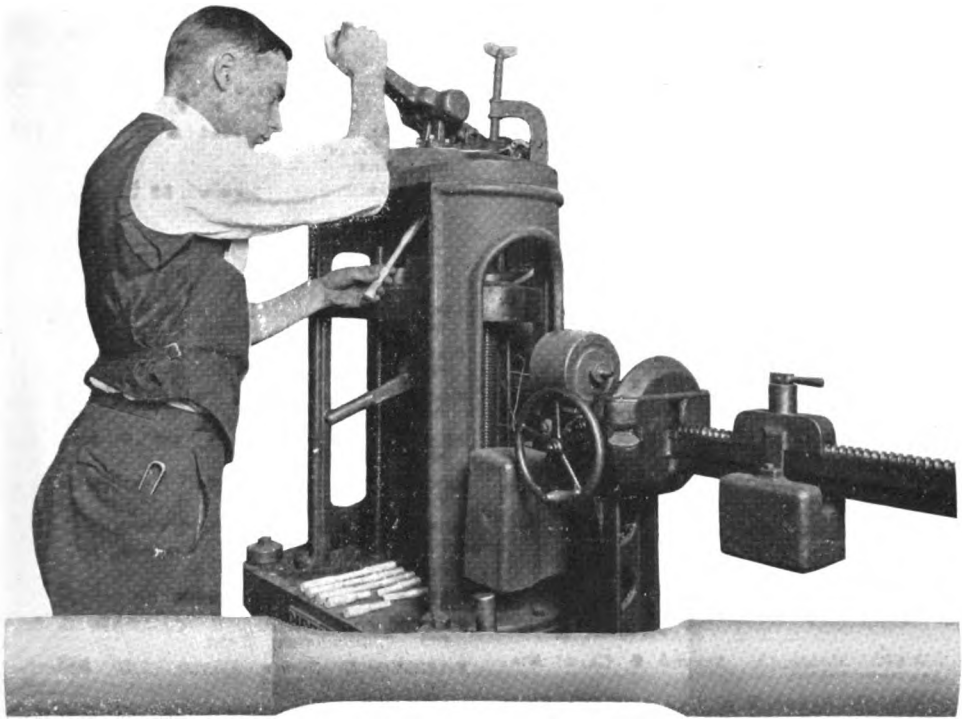

For Moral Effect

Test bars from every heat in every plant must prove their worth in this machine. There are two big reasons for this test.

First, it is a constant reminder to every workman that he must do his part of the work with the utmost care.

Second, by watching results—heat after heat, day after day—the limits grow closer and closer, perfection is more and more nearly attained, every man is always striving to improve that which is already very, very good.

This is but one of many factors which combine to make LYNITE and LYNUX castings better. Our whole service is the result of an entire organization working towards ideal production rather than ordinary production.

How do you benefit? High standards and extraordinary precautions in our plants are a guaranty of highest quality at a reasonable price, because defective loss in the foundry is minimized, and time is saved whereby delivery to you is quicker.

Let us bid on your next order, and in the meantime ask us to tell you the whole story of our service on LYNITE and LYNUX.

LYNITE

The Aluminum Castings Company

LYNITE and LYNUX Castings

Cleveland Detroit Buffalo Manitowoc, Wis. Fairfield, Conn.

Address correspondence to 6217 Carnegie Avenue, Cleveland, Ohio.

LYNUX

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CASTINGS (Continued)

ALUMINUM CASTINGS (Continued)

ERIE Specialty Co., 505 W. 12th St., Erie, Pa.

ESSEX Brass Foundry Co., Sixth & Harvard Sts., Cambridge, Mass.

EXETER Machine Works, Pittston, Pa.

FARIES Mfg. Co., Decatur, Ill.

FRIES & Co., Buffalo, N. Y.

FRONTIER Engineering Co., 816-36 Fort St., W. Detroit, Mich.

GENERAL Aluminum & Brass Mfg. Co., E. Grand Blvd. & St. Aubin Ave., Detroit, Mich.
(See pages 105 and 261.)

GENERAL Castings Co., Ford Bldg., Detroit, Mich.

GERMANN Bronze Co., 355 W. 19th St., Erie, Pa.
(See page 291.)

GERSON-CAREY Co., Kalamazoo St. & L. S. Ry., Lansing, Mich.

GRAHAM & Co., James, 293 Wooster St., New Haven, Conn.
(See page 209.)

HARLEY Co., Springfield, Mass.
(See page 113.)

HOTZ Foundry & Mfg. Co., Fremont, O.

HOWARD Metal Co., Second & Canal Sts., Reading, Pa.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

INDIANA Brass Co., 659 W. McClurg St., Frankfort, Ind.

INDIANAPOLIS Brass Co., 1012 E. Michigan St., Indianapolis, Ind.

JEFFERSON Brass Foundry, 209 King St., Brooklyn, N. Y.

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

KEYLESS Lock Co., 1401 Newman St., Indianapolis, Ind.

KOKOMO Brass Works, Kokomo, Ind.

LEE Co., Wm. O., Port Huron, Mich.
(See page 113.)

LIGHT Mfg. & Foundry Co., Pottstown, Pa.
(See page 287.)

LIMERICK Co., J. Arthur, 960 N. Howard St., Baltimore, Md.
(See page 369.)

LIVERMORE, Homer F., 81 Pearl St., Boston, Mass.

LUMEN Bearing Co., Buffalo, N. Y.
(See pages 195 and 259.)

LYNITE—See Aluminum Castings Co.

McADAMITE—See United States McAdamite Metal Co.

McRAE Brass Mfg. Co., 611-19 W. Fort St., Detroit, Mich.

MACHINISTS Foundry Co., Muncie, Ind.

MILWAUKEE Aluminum & Brass Foundry Co., 295-97 Reed St., Milwaukee, Wis.

MONUMENTAL Bronze Co., 354 Howard St., Bridgeport, Conn.

NABRALCO—See National Bronze & Aluminum Foundry Co.

NATIONAL Brass Mfg. Co., 191-93 Mill St., Rochester, N. Y.

NATIONAL Bronze & Aluminum Foundry Co., 2539 E. 79th St., Cleveland, O. "Nabralco."

NORTH & Judd Mfg. Co., New Britain, Conn.

OBERDORFER Brass Co., M. L., 804 E. Water St., Syracuse, N. Y.

PARKER White Metal & Machine Co., Erie, Pa.
(See page 495.)

PAULSON & Son, Thomas, 97 Second Ave., Brooklyn, N. Y.
(See page 425.)

PIONEER Brass Works, Indianapolis, Ind.
(See page 101)

PROVIDENCE Brass & Aluminum Foundry, 460 Eddy St., Providence, R. I.

RACINE Aluminum & Brass Foundry Co., 1329 12th St., Racine, Wis.

RACINE Brass & Iron Co., 1327 Racine St., Racine, Wis.

REEVES & Co., Paul S., 1415-25 Catharine St., Philadelphia, Pa.

RINCON Foundry Co., 849-65 Seventh St., San Francisco, Cal.

ROSTAND Mfg. Co., Milford, Conn.

RUTENBER Motor Co., Marion, Ind.
(See page 269.)

SAYRE Stamping Co., Sayre, Pa.

SHARP Brass Works, J. C., Boyce & 20th Sts., Chattanooga, Tenn.

SHERWOOD Brass Works, 1167 Jefferson Ave., Detroit, Mich.

SILVER Aluminum Metal Co., 294-96 Taaffe Pl., Brooklyn, N. Y.

STANDARD Brass Foundry Co., 1831 Columbus Rd., N. W., Cleveland, O.

STANDARD Brass & Iron Works, 1820 St Paul Ave., Milwaukee, Wis.

STANDARD Foundry Co., Hartford, Conn.

TITAN Copper Products Co., Buffalo, N. Y.

TRIUMPH Electric Co. (Oakley), Cincinnati, O.

U. S. Brass & Aluminum Foundry Co., Waukesha, Wis.

UNITED States McAdamite Metal Co., Isabella Ave. & E. St., Detroit, Mich. "McAdamite."

WERRA Aluminum Foundry Co., Waukesha, Wis.
(See page 513.)

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

WILLIAMS & Son, E. A., 105-11 Plymouth St., Jersey City, N. J.

WISCONSIN Aluminum Foundry Co., Manitowoc, Wis.

BRONZE AND BRASS CASTINGS

A. B. C. Castings Co., 6515 Carnegie Ave., S. E., Cleveland, O.

ADAMS & Westlake Co., Chicago, Ill. "Adlake."
(See page 153.)

ADLAKE—See Adams & Westlake Co.

AETNA Brass Mfg. Co., 3870-90 Hamilton Ave., Cleveland, O.

ALUMINUM Castings Co., 6217 Carnegie Ave., Cleveland, O. "Lynux."
(See page 99.)

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of the better grade in GUN METAL, ALUMINUM, PHOSPHOR BRONZE, or MANGANESE BRONZE.

We show more uniformity of metal and shape of castings than most foundries.

PIONEER Phosphor Bronze for Bearings has no equal.

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for machines where quality and accuracy are required.

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We furnish more vital parts for race cars than any ten other shops.

Pioneer Brass Works

Indianapolis, Indiana

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CASTINGS (Continued)

BRONZE AND BRASS CASTINGS (Continued)

AMERICAN Air Compressor Co., 1523-31 W. Fort St., Detroit, Mich.

AMERICAN Brass & Iron Co., Detroit, Mich.
(See page 211.)

AMERICAN Bronze Co., 140-80 Non-Gran Blvd., Berwyn, Pa.
(See page Opposite Inside Front Cover.)

AMERICAN Bronze Co., 90-108 Arthur St., Buffalo, N. Y.

AMERICAN Car & Ship Hardware Mfg. Co., Dept. T, New Castle, Pa.
(See page 167.)

AMERICAN Castings Co., Byrket St. & L. S. & M. S. Ry., Mishawaka, Ind.

AMERICAN Manganese Bronze Co., 92 John St., New York, N. Y.

AMERICAN Pin Co., Waterbury, Conn.

AMESBURY Brass & Foundry Co., Amesbury, Mass.

ANDERSON Foundry Co., Wm. B., 24-30 S. Clinton St., Chicago, Ill.

ATKINSON Co., Rochester, N. Y. "Samson."
(See page 261.)

ATLAS Brass Foundry, 155 A St., Boston, Mass.

ATLAS Brass Foundry Co.,980-90 S. Front St., Columbus, O.

ATTWOOD Brass Works, Scribner Ave. & Bowery St., Grand Rapids, Mich.
(See page 249.)

AUBURN Foundry, Auburn, Ind.

B. G. & M. Mfg. Co., 543 N. Franklin St., Chicago, Ill.

BAY View Foundry Co., McDonough, Water & Shelby Sts., Sandusky, O.

BLAKE, Edwin J., 565 Windsor St., Hartford, Conn.

BOSTON Casting Co., 12 Pearl St., Boston, Mass.

BRASS & Aluminum Foundry & Machine Co., 364 Trombly St., Detroit, Mich.

BUCKEYE Brass & Mfg. Co., 1807 Columbus Rd., Cleveland, O.

BUCKEYE Iron & Brass Works, 824 E. Third St., Dayton, O.

BUNTING Brass & Bronze Co., 737 Spencer St., Toledo, O.
(See page 423.)

BURNS & Bassick Co., Bridgeport, Conn.
(See page 195.)

CARTER, E. T., Plainville, Conn.

CENTRAL Brass Foundry, 105-07 S. Clinton St., Chicago, Ill.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O.

CHAMPION Brass Works, Coldwater, Mich.

CITY Brass Foundry Co., 5310 St. Clair Ave., N. E., Cleveland, O.

CONESTOGA Job & Brass Foundry, 246 N. Christian St., Lancaster, Pa.

CONSOLIDATED Casting Co., Mechanicsville, N. Y.

CRAMP & Sons Ship & Engine Bldg. Co., William, Philadelphia, Pa.
(See page 261.)

DAMASCUS Bronze Co., Pittsburg, Pa.

DELTA—See Phosphor Bronze Smelting Co.

D'ESTE Co., Julian, 24 Canal St., Boston, Mass.

DETROIT Motor Casting Co., 299-303 Beaufait Ave., Detroit, Mich.

DIAMOND Brass Foundry & Machine Co., 1115 Washington Blvd., Chicago, Ill.

DORCHESTER Brass & Aluminum Foundry, Old Sturtevant Bldg. (Jamaica Plain), Boston, Mass.

EAGLE—See Stillman White Foundry Co.

EDNA Brass Mfg. Co., 525-33 Reading Rd., Cincinnati, O.

ELEPHANT—See Phosphor Bronze Smelting Co.

ELLSWORTH Brass Foundry Co., 249 R. R. Ave., Bridgeport, Conn.

ERIE Specialty Co., 505 W. 12th St., Erie, Pa.

ESSEX Brass Foundry Co., Sixth & Harvard Sts., Cambridge, Mass.

EUREKA Brass Co., 2210-18 Scott Ave., St Louis, Mo.

EUREKA Co., North East, Pa.
(See page 257.)

EXETER Brass Works, Exeter, N. H.

EXETER Machine Works, Pittston, Pa.

FAIRVIEW Foundry Co., Detroit, Mich.

FARIES Mfg. Co., Decatur, Ill.

FRIES & Co., Buffalo, N. Y.

FRONTIER Engineering Co., 816-36 Fort St., W., Detroit, Mich.

GARAGE Equipment Mfg. Co., Milwaukee, Wis.
(See page 83.)

GENERAL Aluminum & Brass Mfg. Co., E. Grand Blvd. & St. Aubin Ave., Detroit, Mich.
(See pages 105 and 261.)

GENERAL Castings Co., Ford Bldg., Detroit, Mich.

GERMANN Bronze Co., 355 W. 19th St., Erie, Pa.
(See page 291.)

GERSON-CAREY Co., Kalamazoo St. & L. S. Ry., Lansing, Mich.

GLANTZ & Johnson, 15 Forest Ave., Jamestown, N. Y.

GRAHAM & Co., James, 293 Wooster St., New Haven, Conn.
(See page 299.)

GREY Mfg. Co., C. M., East Orange, N. J.

HARLEY Co., Springfield, Mass.
(See page 113.)

HARPER, Thomas, 139 Lafayette St., New York, N. Y.

HERCULES Float Works, 200-10 Franklin St., Springfield, Mass.

HOMER Brass Works, 231 Race St., Philadelphia, Pa.

HOTZ Foundry & Mfg. Co., Fremont, O.

HOWARD Metal Co., Second & Canal Sts., Reading, Pa.

IDEAL Bronze Co., 1265 E. 55th St., Cleveland, O.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

INDIANA Brass Co., 659 W. McClurg St., Frankfort, Ind.

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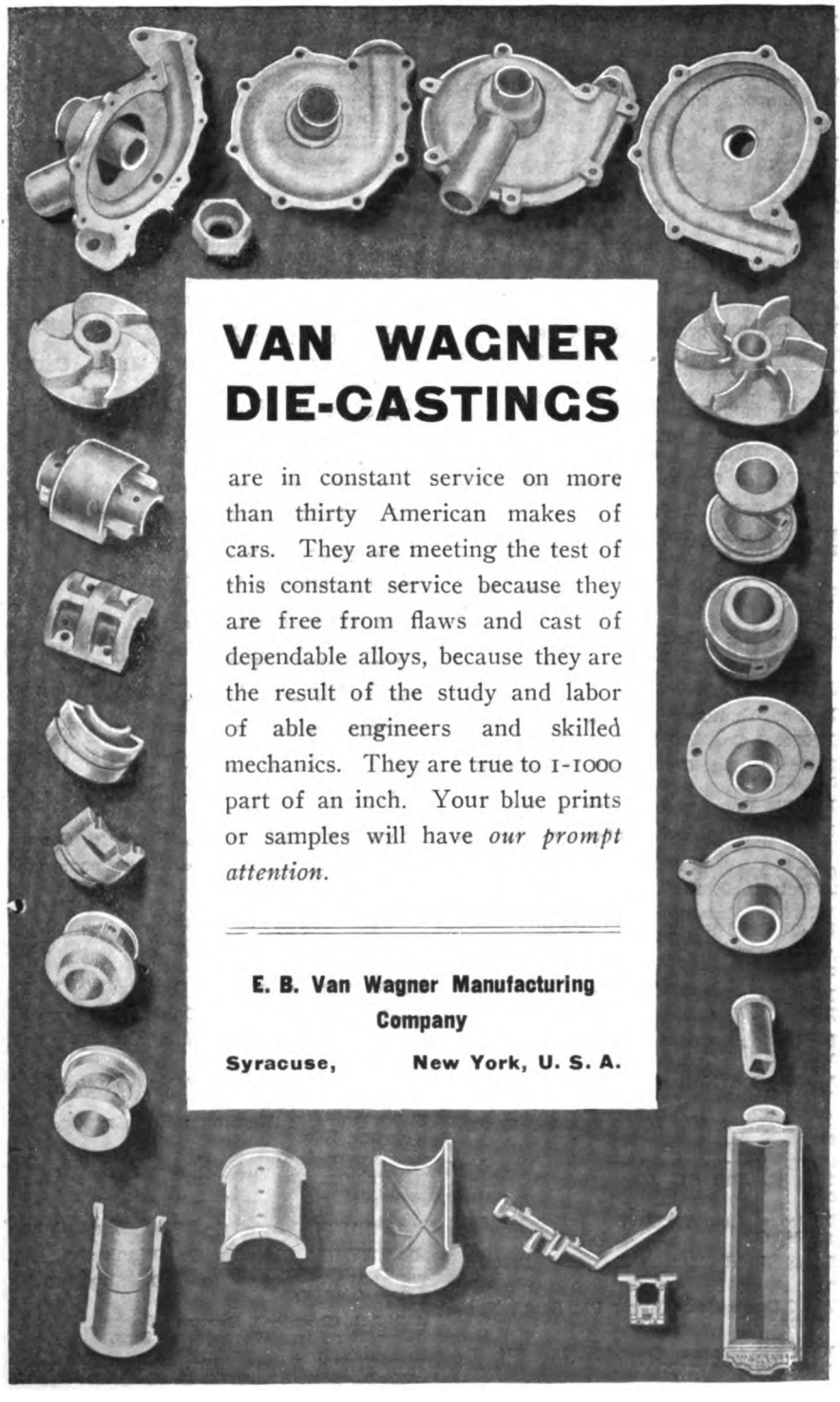

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CASTINGS (Continued)

BRONZE AND BRASS CASTINGS (Continued)

INDIANAPOLIS Brass Co., 1012 E. Michigan St., Indianapolis, Ind.

IVES Co., H. B., 5-17 Artizan St., New Haven, Conn.

JEFFERSON Brass Foundry, 209 King St., Brooklyn, N. Y.

JENKINS Brass Co., T. Robert, 527 Colvin St., Baltimore, Md.

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

KEYLESS Lock Co., 1401 Newman St., Indianapolis, Ind.

KOKOMO Brass Works, Kokomo, Ind.

LANGSENKAMP-WHEELER Brass Works, 1206-28 Shelby St., Indianapolis, Ind.

LEE Co., Wm. O., Port Huron, Mich.
(See page 113.)

LEVETT Co., W. M., Tenth Ave. & 36th St., New York, N. Y.

LIGHT Mfg. & Foundry Co., Pottstown, Pa.
(See page 287.)

LIMERICK Co., J. Arthur, 960 N. Howard St., Baltimore, Md.
(See page 369.)

LIVERMORE, Homer F., 81 Pearl St., Boston, Mass.

LUMEN Bearing Co., Buffalo, N. Y.
(See pages 195 and 259.)

LUSK Bros., Foundry Co., 209-15 Van Buren St., Jackson, Mich.

LYNUX—See Aluminum Castings Co.

McGILL Metal Co., Valparaiso, Ind.

McRAE Brass Mfg. Co., 611-19 W. Fort St., Detroit, Mich.

MACHINISTS Foundry Co., Muncie, Ind.

MEDINA Stamping & Machine Co., Medina, N. Y.

METROPOLITAN Mfg. Co., 12th St. & G. T. R. R., Detroit, Mich.

MILWAUKEE Aluminum & Brass Foundry Co., 295-97 Reed St., Milwaukee, Wis.

MILWAUKEE Valve Co., 139 Burrell St., Milwaukee, Wis.

MONUMENTAL Bronze Co., 354 Howard St., Bridgeport, Conn.

MUELLER Metal Co., 288 Dyer St., Providence, R. I.

NABRALCO—See National Bronze & Aluminum Foundry Co.

NATIONAL Brass Mfg. Co., 191-93 Mill St., Rochester, N. Y.

NATIONAL Bronze & Aluminum Foundry Co., 2539 E. 79th St., Cleveland, O. "Nabralco."

NOLTE Brass Co., 27-29 W. Jefferson St., Springfield, O.

NORTH & Judd Mfg. Co., New Britain, Conn.

NORWALK Brass Co., Keyser Pl., South Norwalk, Conn.

OBERDORFER Brass Co., M. L., 804 E. Water St., Syracuse, N. Y.

ONONDAGA Brass Co., Decker & Brown Sts., Syracuse, N. Y.

PARKER White Metal & Machine Co., Erie, Pa.
(See page 495.)

PAULSON & Son, Thomas, 97 Second Ave., Brooklyn, N. Y.
(See page 425.)

PHOSPHOR Bronze Smelting Co., 2200 Washington Ave., Philadelphia, Pa. "Elephant," "Delta."
(See page 491.)

PIONEER Brass Works, Indianapolis, Ind.
(See page 101.)

PITTSBURG Brass Mfg. Co., 32d St. & Penn Ave., Pittsburg, Pa.

PROGRESSIVE Brass Foundry, Keowee & Herbert Sts., Dayton, O.

PROVIDENCE Brass & Aluminum Foundry, 460 Eddy St., Providence, R. I.

RACINE Aluminum & Brass Foundry Co., 1329 12th St., Racine, Wis.

REEVES & Co., Paul S., 1415-25 Catharine St., Philadelphia, Pa.

RIDER-BAGG Co., 369 Birnie Ave., Springfield, Mass.

RINCON Foundry Co., 349-65 Seventh St., San Francisco, Cal.

ROSTAND Mfg. Co., Milford, Conn.

RUTENBER Motor Co., Marion, Ind.
(See page 269.)

SAMSON—See Atkinson Co.

SAYRE Stamping Co., Sayre, Pa.

SHARP Brass Works, J. C., Boyce & 20th Sts., Chattanooga, Tenn.

SHERWOOD Brass Works, 1167 Jefferson Ave., Detroit, Mich.

SMITH Mfg. Co., A. P., Norman & Lawrence Sts., East Orange, N. J.

SPENCER'S Sons, I. S., Guilford, Conn.

STANDARD Brass Foundry Co., 1831 Columbus Rd., N. W., Cleveland, O.

STANDARD Brass & Iron Works, 1820 St. Paul Ave., Milwaukee, Wis.

STANDARD Foundry Co., Hartford, Conn.

STERLING Specialty Co., New Coomerstown, O.

STILLMAN White Foundry Co., 1 Bark St., Providence, R. I. "Eagle."

THIERY & Kendrick Mfg. Co., 660-64 Franklin St., Detroit, Mich.

TITAN Copper Products Co., Buffalo, N. Y.

TRIUMPH Electric Co. (Oakley), Cincinnati, O.

TURNER & Seymour Mfg. Co., Torrington, Conn.

UNIQUE Brass Foundry Co., 25 Illinois St., Buffalo, N. Y.

U. S. Brass & Aluminum Foundry Co., Waukesha, Wis.

VANADIUM Metals Co., Vanadium Bldg., Pittsburg, Pa. "Victor."

VICTOR—See Vanadium Metals Co.

WATERBURY Mfg. Co., Waterbury, Conn.

WAUKESHA Foundry Co., Waukesha, Wis.

WELLMAN Bronze Co., 6017 Superior Ave., Cleveland, O.

WELLS Chemical Bronze Works, Temple & Harding Sts., Worcester, Mass.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

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Accurate—Dense and True to Specifications

Let us have your prints for estimate. We shall be glad to recommend an alloy suitable for your purpose and give you the benefit of the knowledge gained during our thirty-five years in the mixed metal business.

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111 Broadway, New York
1205 Westminster Bldg., Chicago
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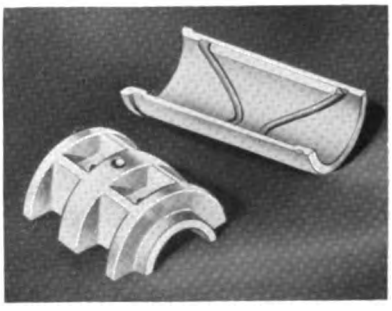
Are the Standard for Quality



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EMPLOYING THE FRENCH SYSTEM
OF DRY SAND MOULDING

DETROIT MICHIGAN

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CASTINGS

for those who demand the highest of quality and the best of service.

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Plant No. 2
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CASTINGS (Continued)

BRONZE AND BRASS CASTINGS (Continued)

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

WILLIAMS & Son, E. A., 105-11 Plymouth St., Jersey City, N. J.

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

DIE CASTINGS

A. B. C. Castings Co., 6515 Carnegie Ave., S. E., Cleveland, O.

ALEMITE Metals Co., 214-20 N. Carpenter St., Chicago, Ill.

AMERICAN Die Casting Co., Vandalia Tracks & White River, Indianapolis, Ind.
(See page 113.)

AMERICAN Die Casting Co. of New York, 375-83 Kent Ave., Brooklyn, N. Y.

ATLAS Die Casting Co., 107 N. Franklin St., Syracuse, N. Y.

DOEHLER Die-Casting Co., Court & Ninth Sts., Brooklyn, N. Y.
(See page 111.)

FRANKLIN Mfg. Co., 401 S. Geddes St., Syracuse, N. Y.
(See page 105.)

GERMANN Bronze Co., 355 W. 19th St., Erie, Pa.
(See page 291.)

GREY Mfg. Co., C. M., East Orange, N. J.

HARLEY Co., Springfield, Mass.
(See page 113.)

HOYT Metal Co., 300 N. Broadway, St. Louis, Mo.
(See page 105.)

INDIANA Die Casting Co., 11th & Lewis Sts., Indianapolis, Ind.

KIDDER-OSWALD Co., Dayton, O.

LEGLER-EILERMAN Co., Bacon St., Dayton, O.

LIGHT Mfg. & Foundry Co., Pottstown, Pa.
(See page 287.)

LUMEN Bearing Co., Buffalo, N. Y.
(See pages 195 and 259.)

MILWAUKEE Die Casting Co., Milwaukee, Wis.
(See page 107.)

MOBERG, C. J., 118 Pearl St., Mt. Vernon, N. Y.

MODERN Die & Tool Co., 202-04 S. Penn St., Indianapolis, Ind.

MOGUL Metal Co., Detroit, Mich.
(See page 107.)

MUZZY-LYON Co., Detroit, Mich.
(See page 107.)

NATIONAL Lead Co., New York, N. Y.
(See page 353.)

PARKER White Metal & Machine Co., Erie, Pa.
(See page 495.)

PHOENIX Die Casting Co., 21 Illinois St., Buffalo, N. Y.
(See page 107.)

PRECISION Die-Casting Co., Fayetteville, N. Y.

SANFORD Co., David C., 33-39 Tulip St., Bridgeport, Conn.

STEWART Mfg. Co., J. K., Wells St. Bridge, Chicago, Ill.

STROH Die Moulded Casting Co., 161-71 Michigan St., Milwaukee, Wis.

SYRACUSE Die Moulded Casting Co., Syracuse, N. Y.

SYRACUSE Smelting Works, Jewell St., Brooklyn, N. Y.

VAN WAGNER Mfg. Co., E. B. Syracuse, N. Y.
(See page 103.)

VEEDER Mfg. Co., 22 Sargeant St., Hartford, Conn.

WHITE Brass Casting Co., 1656 Austin Ave., Chicago, Ill.

WING & Co., J. T., 15-19 Woodward Ave., Detroit, Mich.

GRAY IRON CASTINGS

ACME Foundry Co., Detroit, Mich.

ADRIAN Steel Casting Co., Adrian, Mich.

AMERICAN Foundry & Mfg. Co., 11th & Herbert Sts., St. Louis, Mo.

AMERICAN Tool & Machine Co., Boston, Mass.

ARNOLD Co., Hoyt St., Norwalk, Conn.

ATLAS Foundry Co., Military St., Detroit, Mich.

AUBURN Foundry, Auburn, Ind.

BARKER, James, Sixth & Cayuga Sts., Philadelphia, Pa.

BARLOW Foundry Co., 551 N. J. R. R. Ave., Newark, N. J.

BAY View Foundry Co., McDonough, Water & Shelby Sts., Sandusky, O.

BOSTON Casting Co., 12 Pearl St., Boston, Mass.

BYRAM Foundry Co., 921 Biddle St., Indianapolis, Ind.

CAMPBELL, Wyant & Cannon Foundry Co., Muskegon, Mich.
(See page 109.)

CHENEY & Son, S., Manlius, N. Y.

COLUMBIA Gray Iron Co., Second & Linden Sts., Columbia, Pa.

CONSOLIDATED Castings Co., Mechanicsville, N. Y.

CRAMP & Sons Ship & Engine Bldg. Co., William, Philadelphia, Pa.
(See page 261.)

DEAN Mfg. Co., 262 Front St., Newport, Ky.

DETROIT Foundry Co., N. Grand Blvd. & Riopelle St., Detroit, Mich.

ELEVATOR Supply & Repair Co., 561 W. Monroe St., Chicago, Ill.

EMPIRE Foundry Co., Jersey Ave., New Brunswick, N. J.

EMPIRE Foundry Co., 203 Temple St., Syracuse, N. Y.

ENTERPRISE Foundry Co., 1127-57 E. Warren Ave., Detroit, Mich.

FAIRVIEW Foundry Co., Detroit, Mich.

FANNER Mfg. Co., Brookside Pk., Cleveland O.

FERRO Machine & Foundry Co., 47 Hubbard Ave., Cleveland, O.

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have a standardized uniformity of quality, density and accuracy.

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there is one suited to your purpose.

Mogul Cored Bars
of Bronze and Babbitt Alloys in many sizes for convenient use.

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DIE CASTING CO.
DIFFICULT WORK
ACCURACY
QUALITY AND
PROMPT SERVICE
MILWAUKEE, WISCONSIN

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CASTINGS (Continued)

GRAY IRON CASTINGS (Continued)

FRONTIER Iron Works, 41 Letchworth St., Buffalo, N. Y.

FULTON Foundry & Machine Co., 25 Furman St., Brooklyn, N. Y.

HALL Gas Engine Mfg. Co., Byesville, O.

HART Foundry Co., 10 Allen St., Lawrence, Mass.

HOLYOKE Motor Foundry Co., Holyoke, Mass.

HUBLEY Mfg. Co., Lancaster, Pa.

INTERSTATE Foundry Co., E. 61st St. & Erie R. R., Cleveland, O.

LENNOX Jack Works, 1104 Prospect Ave., S. E., Cleveland, O.

LOVEWELL-HENRICI Co., 936-42 Broadway, Chelsea, Mass.

LUSK Bros., Foundry Co., 209-15 Van Buren St., Jackson, Mich.

LYCOMING Foundry & Machine Co., Williamsport, Pa.
(See page 635.)

McFARLAND Foundry & Machine Co., Trenton, N. J.

MACHINISTS Foundry Co., Muncie, Ind.

MANUFACTURERS Foundry Co., Waterbury, Conn.
(See page 407.)

MOHN & Kershner, Green St., Reading, Pa.

MOTOR Foundry Co., Detroit, Mich.

MUNCIE Foundry & Machine Co., Muncie, Ind.
(See page 531.)

NATIONAL Sewing Machine Co., Belvidere, Ill.

NEW Standard Foundry Co., Detroit, Mich.
(See page 105.)

NORTMANN-DUFFKE Foundry Co., 27th Ave. & N. W. R. R., Milwaukee, Wis.

PALMER & De Mooy Foundry Co., 1658 Leonard St., Cleveland, O.

PEQUONNOCK Foundry, Fifth St. Extension, Bridgeport, Conn.

PORTLAND Foundry & Machine Co., Portland, Ind.

RACINE Brass & Iron Co., 1327 Racine St., Racine, Wis.

RACINE Foundry Co., Tenth St. & C., M. & St. P. Ry., Racine, Wis.

REEDY Foundry Co., 4600 Iowa St., Chicago, Ill.

RELIANCE Foundry Co., Richmond, Ind.

RINCON Foundry Co., 349-65 Seventh St., San Francisco, Cal.

RUTENBER Motor Co., Marion, Ind.
(See page 269.)

SEAGER Engine Works, Lansing, Mich.

SMITH Mfg. Co., A. P., Norman & Lawrence Sts., East Orange, N. J.

SMITH Mfg. Co., Philip, Sidney, O.

SOWERS Mfg. Co., 1300-10 Niagara St., Buffalo, N. Y.

SPENCER'S Sons, I. S., Guilford, Conn.

SPRING City Foundry Co., St. Paul Ave. & State St., Waukesha, Wis.

STANDARD Foundry Co., Forest & Kewaunee Sts., Racine, Wis.

STOWELL Mfg. & Foundry Co., South Milwaukee, Wis.

SUSQUEHANNA Casting Co., Wrightsville, Pa.

SWEET & Doyle Foundry & Machine Co. (Greene Island), Albany, N. Y.

TRENTON Malleable Iron Co., New York Ave., Trenton, N. J.

TURNER & Seymour Mfg. Co., Torrington, Conn.

UNION Mfg. Co., New Britain, Conn.

URICK Foundry Co., 15th & Cherry Sts., Erie, Pa.

WABASH Foundry Co., Wabash, Ind.

WAYNE Works, 16th & F. Sts., Richmond, Ind.

WEST Side Foundry Co., Watervliet, N. Y.

WESTINGHOUSE Machine Co. (E. Pittsburg), Pittsburg, Pa.

WILSON Foundry & Machine Co., Pontiac, Mich.

WISCONSIN Cylinder Foundry Co., Racine, Wis.

MALLEABLE IRON CASTINGS

ACME Steel & Malleable Iron Works, 245 Military Rd., Buffalo, N. Y.

ALBION Malleable Iron Co., Albion, Mich.

AMERICAN Malleables Co., Lancaster, N. Y.

ARCADE Malleable Iron Co., Worcester, Mass.

BADGER Malleable & Mfg. Co., South Milwaukee, Wis.

BARLOW Foundry Co., 551 N. J. R. R. Ave., Newark, N. J.

BELLE City Malleable Iron Co., Racine, Wis.

BOSTON Casting Co., 12 Pearl St., Boston, Mass.

BUHL Malleable Iron Co., Wight & Adair Sts., Detroit, Mich.

CHISHOLM-MOORE Mfg. Co., Lakeside Ave., & E. 49th St., Cleveland, O.

COLUMBUS Malleable Iron Co., Curtis Ave., Columbus, O.

DAYTON Malleable Iron Co., Dayton, O.

DEVLIN Mfg. Co., Thos., Third & Lehigh Aves., Philadelphia, Pa.

EASTERN Malleable Iron Co., Naugatuck, Conn.

ERIE Malleable Iron Co., Cherry St., & E. P. R. R., Erie, Pa.

FANNER Mfg. Co., Brookside Pk., Cleveland, O.

FLAGG & Co., Stanley G., 1421 Chestnut St., Philadelphia, Pa.

FRAZER & Jones Co., Syracuse, N. Y.

GARAGE Equipment Mfg. Co., Milwaukee, Wis.
(See page 83.)

GENERAL Malleable Co., Warren, O.

GLOBE Malleable Iron & Steel Co., Syracuse, N. Y.

Complete Index to Classification appears on Pages 8 to 26.

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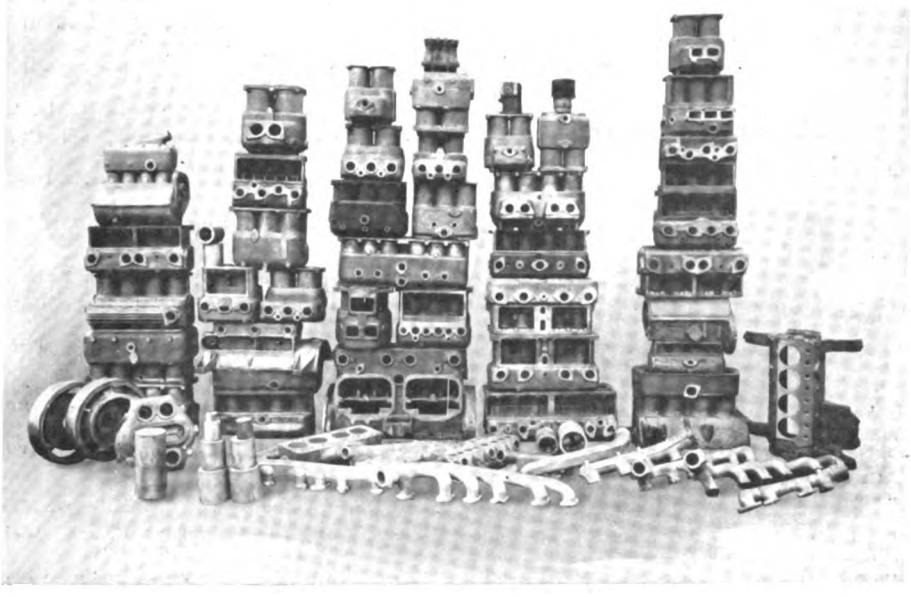
MOTOR CASTINGS OF QUALITY



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WE WILL BE PLEASED TO SUBMIT ESTIMATES ON YOUR WORK

Campbell, Wyant & Cannon Fdy. Co.

MUSKEGON, MICHIGAN

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CASTINGS (Continued)

MALLEABLE IRON CASTINGS (Continued)

ILLINOIS Malleable Iron Co., 1801-25 Diversey Blvd., Chicago, Ill.

JEWEL Steel & Malleable Co., 878 Hertel Ave., Buffalo, N. Y.

JOHNSON & Co., Isaac G., Spuyten Duyvil, New York, N. Y.

LENNOX Jack Works, 1104 Prospect Ave., S. E., Cleveland, O.

MALLEABLE Iron Fittings Co., Branford, Conn.
(See page 485.)

MARION Malleable Iron Works, Marion, Ind.

MEEKER Foundry Co., 95 Clay St., Newark, N. J.

MOLINE Malleable Iron Co., St. Charles, Ill.

NATIONAL Malleable Castings Co., Cleveland, O.
(See page 113.)

NORTH & Judd Mfg. Co., New Britain, Conn.

OHIO Malleable Iron Co., Columbus, O.
(See page 111.)

PRATT Mfg. Co., Wm. E., 35 W. Lake St., Chicago, Ill.

PRATT & Letchworth Co., 189 Tonawanda St., Buffalo, N. Y.

RHODE Island Malleable Iron Works, Hills Grove, R. I.

SPRINGFIELD Malleable Iron Co., George St., Springfield, O.

STOWELL Mfg. & Foundry Co., South Milwaukee, Wis.

SYRACUSE Malleable Iron Works, Syracuse, N. Y.
(See page 435.)

TERRE Haute Malleable & Mfg. Co., N. 19th St., Terre Haute, Ind.

TRENTON Malleable Iron Co., New York Ave., Trenton, N. J.

UNITED States Malleable Iron Co., Woodville St., Toledo, O.

STEEL CASTINGS

ACME Steel & Malleable Iron Works, 245 Military Rd., Buffalo, N. Y.

ADRIAN Steel Castings Co., Adrian, Mich.

ALLISON & Co., Fifth & Market Sts., Chester, Pa.

BALDWIN Steel Co., Charleston, W. Va.

BESCO—See Buchanan Electric Steel Co.

BETHLEHEM Steel Co., Third & Poplar Sts., South Bethlehem, Pa.

BOSTON Casting Co., 12 Pearl St., Boston, Mass.

BUCHANAN Electric Steel Co., Buchanan, Mich. "Besco."

BUHL Malleable Iron Co., Wight & Adair Sts., Detroit, Mich.

CHESTER Steel Castings Co., Chester, Pa.

CHICAGO Steel Foundry Co., Kedzie Ave. & 37th St., Chicago, Ill.

CINCINNATI Steel Castings Co., Queen City & Spring Grove Aves., Cincinnati, O.

CRUCIBLE Steel Casting Co., Lansdowne, Pa.

CRUCIBLE Steel Castings Co., 612 Clinton St., Milwaukee, Wis.

DAMASCUS Crucible Steel Casting Co., New Brighton, Pa.

DAYTON Steel Foundry Co., Dayton, O.

EAGAN-ROGERS Steel & Iron Co., Crum Lynne, Pa.

EASTERN Steel Castings Co., 30 Kemble St., Boston, Mass.

FARRELL-CHEEK Steel Foundry Co., Sandusky, O.

FIRTH & Son Co., Rowland, Phillipsburg, N. J.

FLAGG & Co., Stanley G., 1421 Chestnut St., Philadelphia, Pa.

FORT Pitt Steel Casting Co., McKeesport, Pa.

GERLINGER Steel Casting Co., 59th St. & National Ave., West Allis, Wis.

HESS Steel Castings Co., Bridgeton Ave. & C. R. R. of N. J., Bridgeton, N. J.

INLAND Steel Casting Co., Terra Haute, Ind.

JEWEL Steel & Malleable Co., 878 Hertel Ave., Buffalo, N. Y.

JOHNSON & Co., Isaac G., Spuyten Duyvil, New York, N. Y.

KEYSTONE Steel Casting Co., Chester, Pa.

KRUPP—See Prosser & Son.

LEBANON Steel Foundry, Lebanon, Pa.

LIVERMORE, Homer F., 81 Pearl St., Boston, Mass.

MALLEABLE Iron Fittings Co., Branford, Conn.
(See page 485.)

MAYNARD Steel Casting Co., 710-16 Reed St., Milwaukee, Wis.

MICHIGAN Steel Casting Co., Detroit, Mich.
(See page 213.)

MILBURY Steel Foundry Co., Milbury, Mass

MILWAUKEE Steel Foundry Co., S. Water & Virginia Sts., Milwaukee, Wis.

NATIONAL Malleable Castings Co., Cleveland, O.
(See page 113.)

NATIONAL Steel Casting Co., Montpelier, Ind.

PENINSULAR Steel Castings Co., Iron & Wight Sts., Detroit, Mich.

PENN Steel Castings & Machine Co., Chester, Pa.

PRATT & Letchworth Co., 189 Tonawanda St., Buffalo, N. Y.

PRIME Steel Co., Milwaukee, Wis.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp."
(See page 387.)

PYRO—See Swedish Crucible Steel Co.

RACINE Steel Castings Co., Racine, Wis.

RIVERSIDE Steel Casting Co., Newark, N. J.

SMITH Steel Castings Co., Geo. H., 500 Clinton St., Milwaukee, Wis.

STANDARD Steel Castings Co., Cleveland, O.

STOCK Process Steel Co., Detroit, Mich.

STRONG Steel Foundry Co., Hertel Ave. & Norris St., Buffalo, N. Y.

SWEDISH Crucible Steel Co., Detroit, Mich. "Pyro."
(See page 513.)

TAYLOR-WHARTON Iron & Steel Co., High Bridge, N. J.

TECO—See Treadwell Engineering Co.

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AUTOMOBILE CASTINGS

Ohio Malleable Iron Co.,
Columbus, Ohio

Capacity, 75 to 100 tons of reliable castings daily.

Quality—Our castings combine the *Ductility* of wrought iron, the *Accuracy* of drop forgings and *Strength* of cast steel.

Co-operation Our aim is to become your malleable department, to rush deliveries, to understand your shop practice and adapt our product to it.

Prove what this service can mean to you. There is nothing so convincing as a test from your own patterns so

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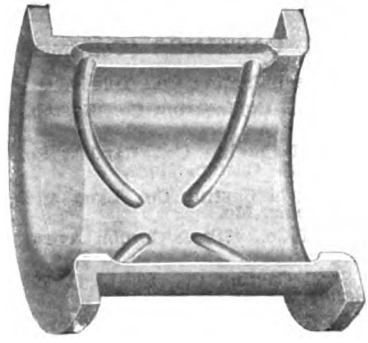

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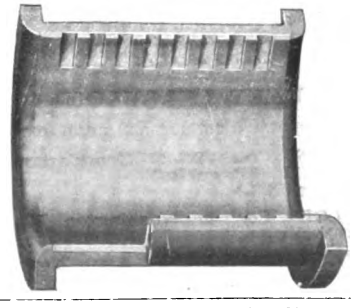
BROOKLYN, N.Y.

Western Plant:
E. Woodruff and N. 12th Sts., Toledo, Ohio

Manufacturers of Babbitt-lined bronze and solid Babbitt bearings, and Die Castings in aluminum and white metals



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CASTINGS (Continued)

STEEL CASTINGS (Continued)

TOLEDO Steel Casting Co., Toledo, O.

TREADWELL Engineering Co., Easton, Pa. "Teco."

UNION Steel Casting Co., Bartlett Sq. (Jamaica Plain), Boston, Mass.

WARREN Steel Casting Co., Lyon & Dorcas Sts., St. Louis, Mo.

WEHR Steel Co., 45th & Gordon Aves., West Allis, Wis.

WEST Steel Casting Co., 805-13 E. 70th St., Cleveland, O.

WHITELEY Steel Co., 108½ Jefferson St. Muncie, Ind.

WHITMAN Co., A. P., Fourth & Booth Sts., Chester, Pa.

CASTORS

CASTORS AND WHEEL TRUCKS

(See also Turntables, Automobile)

AUTO. & Accessories Mfg. Co., 816 W. North Ave., Baltimore, Md. "Norwood."

NORWOOD—See Auto. & Accessories Mfg. Co.

WEBER Automobile Supply Co., 6 E. Kiowa St., Colorado Springs, Colo.

CATCHES

SPRING CABINET CATCHES AND FASTENERS

BRASS Goods Mfg. Co., 280 Nevins St., Brooklyn, N. Y.

BURNS & Bassick Co., Bridgeport, Conn. (See page 195.)

CORBIN Cabinet Lock Co., New Britain, Conn. (See page 247.)

READING Hardware Co., 630 S. Sixth St. Reading, Pa.

SARGENT & Co., Water & Wallace Sts., New Haven, Conn.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. (See page 293.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

CELLULOID

SHEET CELLULOID

(For windows in curtains and storm fronts)

ARLINGTON Co., 725-27 Broadway, New York, N. Y. "Pyralin." (See page 263.)

CELLULOID Co., 30 Washington Pl., New York, N. Y.

FIBERLOID Co., 55 Fifth Ave., New York, N. Y.

PYRALIN—See Arlington Co.

CEMENT

CAST IRON CEMENT

(For repairing cracks in castings)

BRAND Co., S. H., 559 W. Lake St., Chicago, Ill.

CENTRAL Foundry Supply Co., St. Clair Ave. & P. R. R., Columbus, O.

CLARK Cast Steel Cement Co., Shelton, Conn. "Steamtite."

PAXSON Co., J. W., 1019 N. Delaware Ave., Philadelphia, Pa. (See page 523.)

SHANAFELT Mfg. Co., Canton, O. "X-Cel-All."

SMOOTH-ON Mfg. Co., 572-74 Communipaw Ave., Jersey City, N. J.

STEAMTITE—See Clark Cast Steel Cement Co.

STEVENS, Frederic B., Detroit, Mich. (See pages 527 and 528.)

X-CEL-ALL—See Shanafelt Mfg. Co.

RADIATOR REPAIR CEMENT

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. (See page 131.)

BLUE RIBBON—See International Metal Polish Co.

DIAMOND Specialty Co., Indianapolis, Ind.

DURKEE-ATWOOD Co., Minneapolis, Minn. "Rie-Nie." (See page 131.)

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

HOWELL & Co., 648-50 N. Robey St., Chicago, Ill. "Perfection."

INTERNATIONAL Metal Polish Co., Quill St. & Belt R. R., Indianapolis, Ind. "Blue Ribbon."

J-M Leak-No—See Johns-Manville Co.

JOHNS-MANVILLE Co., H. W., Madison Ave. & 41st St., New York, N. Y. "J-M "Leak-No."

JONES Auto Supply Co., 25th St. & Broadway, Oakland, Cal. "Stop-A-Leak."

KOR-KUP—See Rickard, B.

LUBRO Oil Co., 116 Prospect Ave., N. W., Cleveland, O.

MARSHALL Oil Co., Marshalltown, Ia. "Stop-aleak."

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. (See page 449.)

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill.

NORTHWESTERN Chemical Co., Marietta, O. "Se-Ment-Ol." (See page 131.)

PERFECTION—See Howell & Co.

RADFIX Mfg. Co., 121 Massachusetts Ave., Boston, Mass.

RADICO Mfg. Co., Springfield, Mass.

RICKARD, B., 12-14 Park St., Jersey City, N. J. "Kor-Kup."

RIE-NIE—See Durkee-Atwood Co.

RUB-ON Mfg. Co., 89 Brayton St., Buffalo, N. Y. "Sta-Fix."

SE-MENT-OL—See Northwestern Chemical Co.

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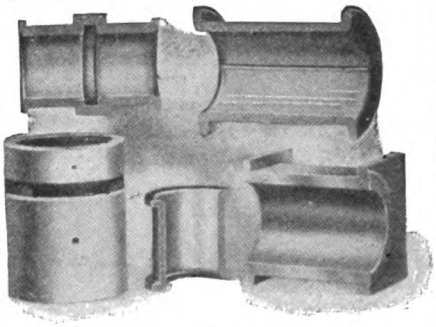

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SHARON, PA. MELROSE PARK, ILL.

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CEMENT (Continued)

RADIATOR REPAIR CEMENT (Continued)

STA-FIX—See Rub-On Mfg. Co.

STOP-A-LEAK—See Jones Auto Supply Co.

STOPALEAK—See Marshall Oil Co.

WONDER WORKER—See Hall-Thompson Co

Z & A Mfg. Co., Hazelton, N. Dak.

TIRE REPAIR CEMENT

ACME Supply Co., Ionia, Mich.

AMERICAN Para Rubber Co., 6727 S. Broadway, St. Louis, Mo.

AMERICAN Tire & Rubber Co., 70-78 Beach St., Akron, O. "Stickfast."

ANCHOR—See National Cement & Rubber Co

ARNSTEIN, Eugene, 46th St. & Wentworth Ave., Chicago, Ill.

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Tire-Doh." (See page 131.)

BESTYET—See St. Louis Rubber Cement Co.

BLUE Ribbon Mfg. Co., 27 Baldwin St. (Charlestown), Boston, Mass. "Premium."

BUFFALO Rubber Mfg. Co., Sussex Ave. & Erie R. R., Buffalo, N. Y.

COX, David H., Chestnut St., Roselle, N. J.

DIAMOND Rubber Co., Akron, O. "Titan." "Seal-Tite."

DUTCH—See Van Cleef Bros.

DYKES Co., John L. G., 222 N. State St., Chicago, Ill.

ENDURANCE Tire & Rubber Co., New Brunswick, N. J.

EUREKA Cement Co., 2-6 Ave. A., Newark, N. J.

EVER RIGHT—See Fry, Keyser.

EVERSTICK—See Liberty Rubber Co.

FRY, Keyser, 616-22 N. Eighth St., Reading, Pa. "Ever Right."

GEM City Liquid Vulcanizer Co., 916 E. Third St., Dayton, O. "U-Vulk."

GOODRICH Co., F. F., Akron, O. "Titan."

GOODYEAR Tire & Rubber Co., Akron, O.

GRAY Specialty Co., 148 Avon Ave., Newark, N. J.

HAZEN-BROWN Co., Court St., Brockton, Mass. "Hazenoid."

HAZENOID—See Hazen-Brown Co.

HOOD Rubber Co., Watertown, Mass. (See page 429.)

K-C—See Western Tire & Rubber Co.

K & W Rubber Co., Orange St., Ashland, O. (See page 429.)

LIBERTY Rubber Co., Orange, N. J. "Everstick."

LICKWID Tyre Tonic Co., 1935-37 S. 19th St., Philadelphia, Pa.

LION Liner Co., 1219 N. Eighth St., Sheboygan, Wis.

M. & M. Co., 414 Prospect Ave., Cleveland, O.

MANHATTAN Rubber Mfg. Co., Passaic, N. J.

MICHELIN Tire Co., Milltown, N. J.

MILLER Rubber Co., Akron, O.

NAM-TAY—See Yatman Rubber Co.

NARCO—See National Rubber Co.

NATIONAL Cement & Rubber Co., 300-16 S. St. Clair St., Toledo, O. "Red Cross," "Anchor," "Pioneer."

NATIONAL Rubber Co., 4409 Papin St., St. Louis, Mo. "Narco."

P. P. & B.—See St. Louis Rubber Cement Co.

PEERLESS Cement Co., 39 Viaduct, Akron, O.

PIONEER—See National Cement & Rubber Co.

PREMIUM—See Blue Ribbon Mfg. Co.

QUAKER City Rubber Co., 629 Market St., Philadelphia, Pa.

RED CROSS—See National Cement & Rubber Co.

RELIABLE Cement Co. (E. Akron), Akron, O.

REPUBLIC Rubber Co., Youngstown, O.

RUBBER Goods Supply & Mfg. Co., Akron, O.

S. H. Mfg. Co., 1761 Broadway, New York, N. Y.

ST. LOUIS Rubber Cement Co., 3046 Lambdin Ave., St. Louis, Mo. "P. P. & B.," "Bestyet."

SAVAGE Tire Co., Main & Sicard Sts., San Diego, Cal.

SEAL-TITE—See Diamond Rubber Co.

SEAMLESS Rubber Co., New Haven, Conn.

SIMPLEX Auto Specialty Co., 733 Woodward Ave., Detroit, Mich.

SIN-TI Rubber Co., Home Life Bldg., Washington, D. C.

STANDARD Rubber & Cable Co., Bridgeport, Conn. "Vulco."

STICKFAST—See American Tire & Rubber Co.

TINGLEY & Co., Chas. O., Rahway, N. J.

TIRE-DOH—See Atlas Auto Supply Co.

TITAN—See Diamond Rubber Co.

U-VULK—See Gem City Vulcanizer Co.

UNITED States Tire Co., Broadway & 58th St., New York, N. Y.

VAN Cleef Bros., 7709-11 Woodlawn Ave., Chicago, Ill. "Dutch."

VULCO—See Standard Rubber & Cable Co.

WESTERN Tire & Rubber Co., 1701-03 Grand Ave., Kansas City, Mo. "K-C."

YATMAN Rubber Co., 267-69 Mt. Pleasant Ave., Newark, N. J. "Nam-tay."

YOUNG, Orlando W., 277 Halsey St., Newark, N. J.

CHAIN

TRANSMISSION OR DRIVING CHAIN

AMERICAN High Speed Chain Co., Indianapolis, Ind. (See page 135.)

BALDWIN Chain & Mfg. Co., Worcester, Mass. (See page 205.)

BRAMPTON—See Miller, Chas. E.

COVENTRY—See Funke Co.

CULVER-TAYLOR Chain Works, 140 Madison Ave., Detroit, Mich.

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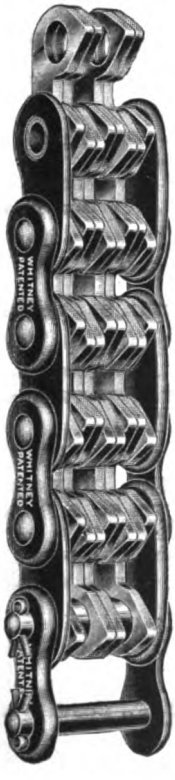
WHITNEY



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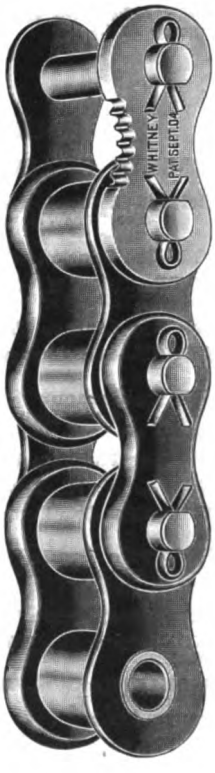

The Whitney Mfg. Co.

Hartford, Conn.

CHAINS—KEYS—HAND MILLING MACHINE

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CHAIN (Continued)

TRANSMISSION OR DRIVING CHAIN (Continued)

DIAMOND Chain & Mfg. Co., 231 W. Georgia St., Indianapolis, Ind.

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. (Importers.) "Renold."
(See page 425.)

FUNKE Co., Herbert F. L., 118 Broad St., New York, N. Y. (Importers.) "Coventry."
(See page 249.)

LINK-BELT Co., Chicago, Ill.
(See page 363.)

MILLER, Chas. E., 97 Reade St., New York, N. Y. (Importer.) "Brampton."

MORSE Chain Co., Ithaca, N. Y.

PEUGEOT—See Smith-Haines.

RENOLD—See Frasse & Co.

SMITH-HAINES, 1761 Broadway, New York, N. Y. (Importers.) "Peugeot."

WHITNEY Mfg. Co., Hartford, Conn.
(See page 115.)

CHAINS

NON-SKID CHAINS OR GRIPS

(For other Anti-Skid Devices—See Bands, Non-Skid; also Treads, Detachable)

BRO-GOR—See Brockett-Gorham Co.

BROCKETT-GORHAM Co., N. State St., Marion, O. "Bro-Gor."

EASYON—See Leather Tire Goods Co.

EMERGENCY—See Garage Equipment Mfg. Co.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Emergency."
(See page 83.)

GRIPPER—See Huffman Mfg. Co.

HOOVER Co., W. H., New Berlin, O.

HUFFMAN Mfg. Co., Youngstown, O. "Gripper."

LEATHER Tire Goods Co., Niagara Falls, N. Y. "Easyon."
(See page 431.)

LYON—See Weed Chain Tire Grip Co.

McKINNON Chain Co., 250 Amherst St., Buffalo, N. Y.

NEVER-SKID Mfg. Co., 794-98 Tenth Ave., New York, N. Y.
(See page 481.)

RID-O-SKID—See Weed Chain Tire Grip Co.

UPTOU Co., Curwensville, Pa.

WEED Chain Tire Grip Co., Bridgeport, Conn. "Lyon," "Rid-O-Skid."
(See page 117.)

CHANNELS

PRESSED STEEL CHANNELS

(See Frames, Pressed Steel)

CHECKS

STEERING GEAR CHECKS

BARKER, W. A., 20-22 S. Hoyne Ave., Chicago, Ill.

L-A—See Lockwood-Ash Motor Co.

LITTLE STEERSMAN—See Modern Auto Appliance Co.

LOCKWOOD-ASH Motor Co., Horton & Main Sts., Jackson, Mich. "L-A."
(See page 539.)

MODERN Auto Appliance Co., Chatham, N. Y. "Little Steersman."

CLAMPS

HOSE CLAMPS

ALLEN Mfg. Co., W. D., 133-35 W. Lake St., Chicago, Ill.
(See page 121.)

AMERICAN Stamping Co., Battle Creek, Mich.

BALZER Co., Gus, 1777 Broadway, New York, N. Y.

BEAUDETTE & Co., R. A., Chippewa Falls, Wis. "R. A. B."

CATELAIN, A., 1446-48 Indiana Ave., Chicago, Ill.
(See page 153.)

CRABILL Hose Clamp Co., Battle Creek, Mich.

ERICKSON & Son, P. E., Port Chester, N. Y.

FITZGERALD Mfg. Co., Torrington, Conn.
(See page 219.)

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O.
(See page 81.)

HERZ & Co., 245 W. 55th St., New York, N. Y.
(See page 311.)

HUDSON Hose Mender Co., Melrose, Mass.

IDEAL Clamp Mfg. Co., 75-77 Jamaica Ave., Brooklyn, N. Y.
(See page 311.)

LAVIGNE—See Magnus Co.

MAGNUS Co., Detroit, Mich. "Lavigne."

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

MORGAN Mfg. Co., John St., Newport, R. I.

NEWARK Stamping Co., Newark, O. "Thompson."

R. A. B.—See Beaudette & Co.

SCHRADER'S Son, A., 783-91 Atlantic Ave., Brooklyn, N. Y.
(See page 441.)

SCHWIER Mfg. Co., H. F., Boydell Bldg., Detroit, Mich. "Scott."
(See page 121.)

SCOTT—See Schwier Mfg. Co.

SHERMAN Mfg. Co., H. B., 12 Barney St., Battle Creek, Mich.

THOMPSON—See Newark Stamping Co.

YERDON, Wm., Main & Center Sts., Fort Plain, N. Y.

SPRING REPAIR CLAMPS

BUCKEYE—See Central Brass & Fixture Co.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O. "Buckeye."

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The Magnet

that draws profitable trade.

DISPLAY WEED CHAINS IN YOUR WINDOWS AND SALES ROOMS AND YOU DISPLAY GOOD SOUND BUSINESS JUDGMENT AS WELL. You will attract all types of cars to your doors—they all must use Weed Chains for safety's sake.

Post mortems are never held over Weed Chains—they never make dead stock. Even when roads and pavements are dry the experienced motorist will buy—*"In time of sunshine he prepares for rains; stops at his dealer's and buys Weed Chains."*

Don't forget to order a stock of Weed Cross Chains, too. We will send you an attractive board on which you can display our Cross Chains to the best advantage if you will but write for it. Now's the time. Write for it now.

Weed Chain Tire Grip Company

Bridgeport, Connecticut

Manufactured for Canada by
DOMINION CHAIN COMPANY, Limited
Head Office: Shaughnessy Building, Montreal, Canada

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CLAMPS (Continued)

SPRING REPAIR CLAMPS (Continued)

KANTALEVER—See Motor Car Equipment Co.

MOTOR Car Equipment Co., 55 Warren St., New York, N. Y. "Kantalever."

WIRE ROPE CLAMPS

BRODERICK & Bascom Rope Co., 817 N. Second St., St. Louis, Mo.

BULL DOG—See Lamson & Sessions Co.

HAZARD Mfg. Co., 81 E. Ross St., Wilkes-Barre, Pa.

LAMSON & Sessions Co., 2133 Scranton Rd., Cleveland, O. "Bull Dog."

LANZ & Sons, Mathew, 3007 Carson St., Pittsburgh, Pa.

LESCHEN & Sons Rope Co., A., 920 N. First St., St. Louis, Mo.

MACOMBER & Whyte Rope Co., 507-09 S. Clinton St., Chicago, Ill.

ROEBLINGS Sons Co., John A., Trenton, N. J.

TRENTON Iron Co., Trenton, N. J.

UNION Elevator & Machine Co., 215-17 W. Ontario St., Chicago, Ill.

WILCOX, Crittenden & Co., 83 Main St., Middletown, Conn.

CLEANERS

ACETYLENE BURNER CLEANERS

BARNARD Specialty Co., 3300 Maple Ave., Los Angeles, Cal.

EDELMANN & Co., E., 225 W. Illinois St., Chicago, Ill.

NELSON Mfg. Co., A., 564-72 W. Randolph St., Chicago, Ill.

FABRIC CLEANERS

PERCAMA—See Perkins Campbell Co.

PERKINS CAMPBELL Co., 634 Broadway, Cincinnati, O. "Percama." (See page 48.)

GLASS WIND SHIELD CLEANERS

AMERICAN Ball Co., 115 Clifford St., Providence, R. I. "Seeclear."

GABRIEL Horn Mfg. Co., 1407 40th St., N. E., Cleveland, O.

GROSSMAN Mfg. Co., Emil, Bush Terminal, Brooklyn, N. Y. "Security."

KERN Mfg. Co., 68-70 E. Tupper St., Buffalo, N. Y.

MARSHALL, Walter & Co., Milwaukee, Wis.

OUTLOOK Wind Shield Cleaner Co., 2581 E. 49th St., Cleveland, O.

SECURITY—See Grossman Mfg. Co.

SEECLEAR—See American Ball Co.

CLEATS

FIBRE WIRING CLEATS

(See also Fibre, Hard)

AMERICAN Vulcanized Fibre Co, 500 Equitable Bldg., Wilmington, Del. (See page 165.)

BLAKE Signal & Mfg. Co., 251 Causeway St., Boston, Mass.

CONCRETE Fibre Co., Ford & Lafayette Sts., Norristown, Pa.

CONTINENTAL Fibre Co., Newark, Del. (See page 165.)

DIAMOND State Fibre Co., Elsmere, Del. (See page 165.)

EASTERN Hard Fibre Co., 50 Church St., New York, N. Y. (See page 639.)

NATIONAL Fibre & Insulation Co., Wilmington, Del.

SPAULDING & Sons Co., J., Wheeler St., Tonawanda, N. Y.

STANDARD Fibre Co., Miller St., Somerville, Mass.

WILMINGTON Fibre Specialty Co., Wilmington, Del. (See page 165.)

CLIPS

CURTAIN CLIPS

(For attaching curtains to wind shields and bow sockets)

STANDARD Top & Equipment Co., 1212 Huron Rd., Cleveland, O. "Swan."

SWAN—See Standard Top & Equipment Co.

SPRING CLIPS

(See also Forgings, Drop)

ATWATER Mfg. Co., Southington, Conn.

CLAPP Mfg. Co., E. D., Auburn, N. Y.

CLEVELAND Hardware Co., Cleveland, O.

COLUMBUS Bolt Works, 162 W. Randolph St., Columbus, O.

ECCLES Co., Richard, Auburn, N. Y. (See page 533.)

PAGE-STORMS Drop Forge Co., Chicopee, Mass.

SEWARD & Son Co., M., Grant Sq., New Haven, Conn.

STRIEBY & Foote Co., 301 Ogden St., Newrak, N. J.

UNION Forging Co., Union, N. Y. (See page 519.)

WILCOX Mfg. Co., D., Mechanicsburg, Pa.

TRIMMERS CLIPS

BUSER-POSTON Tufting Machine Co., Chillicothe, O.

MEYER & Co., John C., Lowell, Mass.

CLOCKS

DASHBOARD CLOCKS

(See also Holders, Watch)

ARCADIA—See Waterbury Clock Co.

BELMONT—See New Haven Clock Co.

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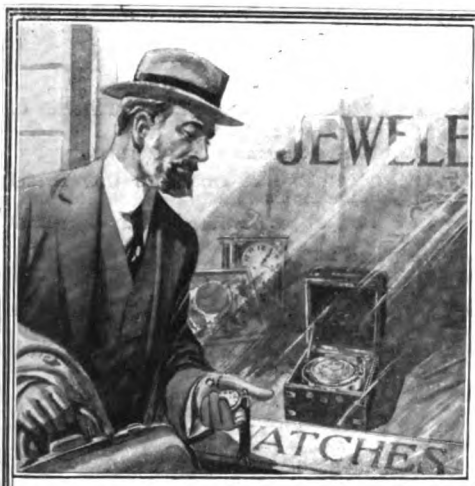

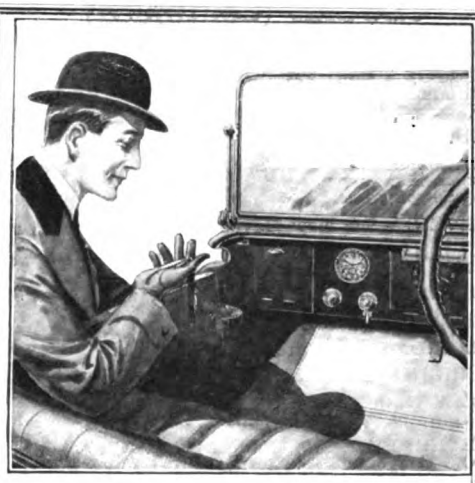

Waltham Automobile Timepieces have chronometer accuracy

So dependable are the Waltham Automobile Timepieces that they can be consulted for the exact time just as the famous Waltham Chronometer is now consulted in jewelers' windows for setting pocket watches the world over.

The time has passed when automobile owners were satisfied with any sort of adapted "clock" they chose, without regard to its fitness for automobile service. The demand is now for a *real* scientific timepiece, constructed to tell the *exact time* on all roads and in all weathers and temperatures.

The Waltham timepieces are the first to meet this demand. They are of chronometer construction, vastly strong, adjusted to all extremes of temperature, proof against the constant vibrations of motor car travel.

No other automobile timepiece can equal this high Waltham standard of precision and strength.

The popularity of the Waltham among motorists points the moral for the manufacturer. To make the timepiece class with the car, adopt the Waltham as standard equipment.

Waltham Watch Company, Waltham, Mass.

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CLOCKS (Continued)

DASHBOARD CLOCKS (Continued)

BOSTON Clock Co., 16 State St., Boston, Mass.
(See page 121.)

BRIARCLIFF—See Levy & Co.

CHELSEA CLOCK Co., 16 State St., Boston, Mass.
(See page 121.)

DEVERE—See New Haven Clock Co.

DIDISHEIM & Bro., Hipp, 54 Maiden Lane, New York, N. Y. "Octava."

DUANE—See New Haven Clock Co.

ETERNA—See Meyer, Ernest C.

FLORIDA—See Waterbury Clock Co.

JERICHO—See New Haven Clock Co.

LEVY & Co., Manasseh, 182 Broadway, New York, N. Y. "Briarcliff," "Safety."

MEYER, Ernest C., Citizens Bldg., Cleveland, O. (Importer.) "Eterna."

MINEOLA—See New Haven Clock Co.

NEW Haven Clock Co., New Haven, Conn. "Jericho," "Westbury," "Mineola," "New "Ormond," "Savannah," "Belmont," "Duane," "Devere."

NEW ORMOND—See New Haven Clock Co.

OCALA—See Waterbury Clock Co.

OCTAVA—See Didisheim & Bro.

ORLANDO—See Waterbury Clock Co.

PALATKA—See Waterbury Clock Co.

PECK-HAMRE Mfg. Co., Berlin, Wis.

PENSACOLA—See Waterbury Clock Co.

PHINNEY-WALKER Keyless Clock Co., 77 E. 130th St., New York, N. Y.

SAFETY—See Levy & Co.

SAVANNAH—See New Haven Clock Co.

SUWANEE—See Waterbury Clock Co.

TAMPA—See Waterbury Clock Co.

TARPON—See Waterbury Clock Co.

WALTHAM Watch Co., Waltham, Mass.
(See page 119.)

WATERBURY Clock Co., Waterbury, Conn. "Florida," "Pensacola," "Tampa," "Ocala," "Suwanee," "Tarpon," "Arcadia," "Orlando," "Palatka."

WESTBURY—See New Haven Clock Co.

CLOTH

ENAMELED CLOTH

ACME Rubber Mfg. Co., Trenton, N. J.

AMERICAN Rubberfelt Co., 2215 Elston Ave., Chicago, Ill. "Arco."

ARCO—See American Rubberfelt Co.

BAYONNE—See Boyle & Co.

BOYLE & Co., John, 112-14 Duane St., New York, N. Y. "Bayonne."

BULL DOG—See Mutty Co.

CARR Co., F. S., Boston, Mass. "Neverleek."
(See page 123.)

CHANDLER Oil Cloth & Buckram Co., East Taunton, Mass.

COOK'S Linoleum Co., Trenton, N. J.

HEATH & Son, Edmund F., Newark, N. J.

LANDERS Bros. Co., Dept. A., Toledo, O.
(See page 427.)

MERITAS—See Standard Oil Cloth Co.

MONARCH Rubber & Oil Cloth Co., Drexel Bldg., Philadelphia, Pa.

MUTTY Co., L. J., Boston, Mass. "Bull Dog."
(See page 239.)

NEVERLEEK—See Carr Co.

POTTER Sons & Co., Thomas, Lafayette Bldg., Philadelphia, Pa.

STANDARD Oil Cloth Co., 320 Broadway, New York, N. Y. "Meritas."

MOHAIR CLOTH

BULL DOG—See Mutty Co.

CARR Co., F. S., Boston, Mass.
(See page 123.)

CHASE & Co., L. C., Boston, Mass.
(See page 317.)

CLEANEASY—See Haartz, J. C.

HAARTZ, J. C., Boston, Mass. "Cleaneasy."

LANDERS Bros. Co., Dept. A., Toledo, O.
(See page 427.)

MUTTY Co., L. J., Boston, Mass. "Bull Dog."
(See page 239.)

PICKENS Auto Cloth Co., 1777 Broadway, New York, N. Y. (Importers.)

SCHERER & Co., H., Detroit, Mich.

RUBBER CLOTH

ACME Rubber Mfg. Co., Trenton, N. J.

BULL DOG—See Mutty Co.

CARR Co., F. S., Boston, Mass. "Neverleek."
(See page 123.)

CHASE & Co., L. C., Boston, Mass.
(See page 317.)

COOK'S Linoleum Co., Trenton, N. J.

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J.

FAIRFIELD Rubber Co., Fairfield, Conn.

HAARTZ, J. C., Boston, Mass. "Paramount."

HODGMAN Rubber Co., 806 Broadway, New York, N. Y.
(See page 351.)

LANDERS Bros. Co., Dept. A., Toledo, O.
(See page 427.)

MATTSON Rubber Co., Lodi, N. J.
(See page 291.)

MONARCH Rubber & Oil Cloth Co., Drexel Bldg., Philadelphia, Pa.

MUTTY Co., L. J., Boston, Mass. "Bull Dog." "Numotor."
(See page 239.)

NEVERLEEK—See Carr Co.

NUMOTOR—See Mutty Co.

PARAMOUNT—See Haartz, J. C.

WHITE & Reid, Jefferson & 11th Sts., Hoboken, N. J.

Complete Index to Classification appears on Pages 8 to 26.

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CHELSEA

FLANGE INSET
AND OTHER TYPES

AUTO
CLOCKS

☞For years, the recognized STANDARD OF EFFICIENCY
☞OVER 100,000 in active use, many thousand for over ten years and giving excellent satisfaction today

Front Wind and Set Back Wind and Set Side Wind and Set, and Key Wind

Catalogs on Request **CHELSEA CLOCK CO., 16 State Street, Boston, Mass., U.S.A.**

"BOSTON" 8-Day High Grade AUTO CLOCKS

Also (Patented) ELECTRIC, you don't have to wind it

Flush Insets, etc. Outside permanent Winding and Setting devices, etc.

CATALOGS ON REQUEST

BOSTON CLOCK CO., 16 State St., BOSTON, MASS.

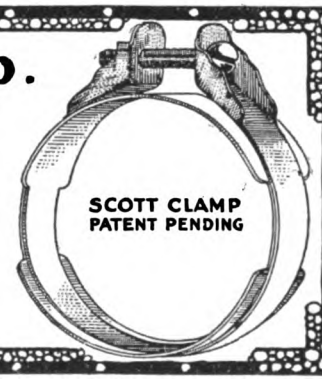
A Perfect Hose Clamp.

Binds evenly all around without pinching or cutting the rubber, because it is designed with care for its work.

The wide spacing and reinforcement at lugs prevents buckling. Drawing up the screws constricts equally from both sides.

Stronger than a tongue clamp and more practical and convenient. Makes an ideal hose joint.

Made to order in all sizes from ½-in. Brass, galvanized steel or nickel plated. *Prices low.* Send for samples.



THE H. F. SCHWIER MFG. CO.
BOYDELL BLDG. DETROIT, MICH.

Patented

Allen Galvanized Steel Hose Clamps for Radiator Hose

They are better in appearance, in durability, in strength, in price.

W. D. Allen Manufacturing Company
133-135 W. Lake Street CHICAGO

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CLOTH (Continued)

UPHOLSTERY CLOTH

(See Broadcloth; also Silk; also Whipcord)

WIRE CLOTH

(For use in Strainers, Horn Screens, etc.)

BUFFALO Wire Works Co., 431 Terrace, Buffalo, N. Y.

DE WITT Wire Cloth Co., 291 Broadway, New York, N. Y.

MICHIGAN Wire Cloth Co., 511 Howard St., Detroit, Mich.

NEW Jersey Wire Cloth Co., Trenton, N. J.

TYLER Co., W. S., Superior Ave. & E. 36th St., Cleveland, O.

WRIGHT Wire Co., Worcester, Mass.

CLOTHING

MOTORISTS CLOTHING

(See also Caps; also Gloves; also Leggings; also Mufflers)

ADIRONDACK—See Spear-Martin Fur Co.

AMERICAN Buffalo Robe Co., 1-7 Howell St., Buffalo, N. Y.

AURORA Uniform Co., 44 Downer Pl., Aurora, Ill.

AUTO-SHIRT Co., Midland, Md.

AUTOMOBILE Apparel Co., Port Chester, N. Y.

BALLARD & Co., J. O., Malone, N. Y.

BEATS ALL—See Standard Oiled Clothing Co.

BISHOP Co., J. H., Wyandotte, Mich.

BLAUVELT Knitting Co., 280-84 Plane St., Newark, N. J.

BOYNTON'S Improved Process Oil Clothing Co., Vincent St., Gloucester, Mass.

BRADLEY Knitting Co., Delavan, Wis.

BURLINGTON Blanket Co., Burlington, Wis. "Chy-Nuke."

CHICAGO Auto Robe Supply Co., 12-16 S. Market St., Chicago, Ill. "Perfection."

CHY-NUKE—See Burlington Blanket Co.

COOK & Bro., E. C., 1301-45 Carroll Ave., Chicago, Ill.

CROSBY-FRISIAN Fur Co., 571 Lyell Ave., Rochester, N. Y.

DEMMERLE & Co., 116 E. 23d St., New York, York, N. Y.

ELCO—See Loewenberg Co.

ELLSWORTH & Thayer Mfg. Co., 336-40 Broadway, Milwaukee, Wis. "Great Western."

ENCK & Keys Mfg. Co., Ashland, O.

EVERDRI—See Loewenberg Co.

FOX, Stiefel & Co., 249 Fifth Ave., New York, N. Y.

FRANKLIN Rubber Co., 105 Summer St., Boston, Mass.

FREEMAN-HIRSCHTICK Co., 227 W. Madison St., Chicago, Ill.

GEM Shirt Co., Fifth & Ferry Sts., Dayton, O.

GOODYEAR Rubber Co., 787 Broadway, New York, N. Y.

GREAT WESTERN—See Ellsworth & Thayer Mfg. Co.

HALL & Co., R. S., Versailles, O.

HILL Mfg. Co., Richard F., 217-19 High St., Newark, N. J.

HODGMAN Rubber Co., 806 Broadway, New York, N. Y. (See page 351.)

HUMPHREYS Sons, R. A., 1021-23 Callowhill St., Philadelphia, Pa.

JAEGERS S. W. S. Co., 395 Fourth Ave., New York, N. Y.

KENYON Co., C., Broadway & 23d St., New York, N. Y.

KLING Bros. & Co., 291 Fifth Ave., Chicago, Ill.

LARGMAN Skirt Mfg. Co., 1023-25 Vine St., Philadelphia, Pa.

LEVY & Co., M., 381 W. Broadway, New York, N. Y.

LOEWENBERG Co., 58-62 Colden St., Newark, N. J. "Everdri," "Elco."

McKIBBEN, Driscoll & Dorsey, St. Paul, Minn.

MANN Co., Leon, 715-19 Broadway, New York, N. Y.

MILFORD Shoe Co., 177 Central St., Milford, Mass.

MOORE-SMITH Co., Winthrop Sq., Boston, Mass.

MORAWETZ Co., 317-25 E. Water St., Milwaukee, Wis.

NEW YORK Leather Coat Co., 33-35 Greene St., New York, N. Y.

PARKER Co., John H., 25 James St., Malden, Mass.

PERFECTION—See Chicago Auto Robe Supply Co.

PONTIAC Knitting Co., Pontiac, Mich.

REVILLON Freres, 19 W. 34th St., New York, N. Y.

ROSENTHAL & Katz, 15 W. 26th St., New York, N. Y.

ROSENWALD & Weil, 500 Franklin St., Chicago, Ill.

RUSZITS Fur Co., John, 7 E. 45th St., New York, N. Y.

SHANHOUSE & Sons, W., Rockford, Ill.

SPEAR-MARTIN Fur Co., 41 Church St., Burlington, Vt. "Adirondack."

STANDARD Oiled Clothing Co., 152d St. & Tinton Ave., New York, N. Y. "Beats All."

STAR Storm Front Co., Canal St., Troy, O.

STROH'S Detroit Overall Co., Detroit, Mich.

TOPLITZ, George, 11 E. 22d St., New York, N. Y.

TOWER Co., A. J., 22 Simmons St., Boston, Mass.

UPTHEGROVE Sporting Goods Co., Valparaiso, Ind.

WALLACE Co., Hugh, 2626 E. Grand Boulevard, Detroit, Mich.

Complete Index to Classification appears on Pages 8 to 26.

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AUTOMOBILE FABRICS
FOR
TOPS AND SEAT COVERS

TRADE MARK
NEVERLEEK

Without doubt the highest grade surface coated material on the market. Unsurpassed for appearance and durability. Read our guarantee:

NEVERLEEK Motor Top Covering is guaranteed absolutely waterproof, without time limit, in any climate, under all circumstances.

Any automobile dealer anywhere can, by writing us, arrange for the recovering of any NEVERLEEK Top, without expense to himself or his customer, provided such top leaks through the fabric.

TRADE MARK
CARRCOCLOTH

An uncoated woven top fabric, absolutely waterproof, yarn dyed. Made in variety of patterns and colorings. Washable seat covers to match.

Also mohairs, serges, cashmeres, lusters, bow linings and rubber cloths.

Sample books and price lists on request.

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BOSTON, MASS.

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CLUTCHES

AUTOMOBILE FRICTION CLUTCHES

B-T-K Gear & Engine Co., 620-30 S. Elliot St., Muncie, Ind.

BORG & Beck, Moline, Ill.

CLEVELAND Clutch Co., Cleveland, O.

GOTTA Gear Co., 720-30 Sixth St., Rockford, Ill.

DETROIT Standard Gear Co., 742 Woodbridge St., E., Detroit, Mich.

FULLER & Sons Mfg. Co., Kalamazoo, Mich.

HARTFORD Auto Parts Co., Hartford, Conn.

HELE-SHAW—See Merchant & Evans Co.

HILLIARD Clutch & Machinery Co., 104 W. Fourth St., Elmira, N. Y.

KONIGSLOW Mfg. Co., Otto, E. 35th St. & Perkins Ave., Cleveland, O.

MERCHANT & Evans Co., Philadelphia, Pa. "Hele-Shaw."

PITTSBURGH Model Engine Co., Pittsburgh, Pa. "Wells."
(See page 497.)

PNEUMATIC Clutch-Motor Co., 812 E. Third St., Los Angeles, Cal.

POSITIVE Clutch Co., 1345 Rawson St., Chicago, Ill.

TRIO Mfg. Co., 1192-1206 Bellevue Ave., Detroit, Mich.

VERGES Mfg. Co., Fourth & Poplar Sts., Milwaukee, Wis.

WABASH Gear Works, Tenth & Farringtor Sts., Terre Haute, Ind.

WARNER Gear Co., Muncie, Ind.
(See page 125.)

WARNER Mfg. Co., Toledo, O.
(See page 243.)

WELLS—See Pittsburgh Model Engine Co.

COATS

AUTOMOBILE COATS

(See Clothing, Motorists)

COCKS

SPRING KEY COCKS

AMERICAN Brass & Iron Co., Detroit, Mich.
(See page 211.)

CRUM-WILEY Mfg. Co., Peru, Ind.

DETROIT Brass Works, 2000 Brooklyn Ave., Detroit, Mich.

EDELMANN & Co., 225 W. Illinois St., Chicago, Ill.

HANCOCK Mfg. Co., 770 Henry St., Charlotte, Mich.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O.

NATIONAL Brass Mfg. Co., 191-93 Mill St., Rochester, N. Y.

STANDARD Brass Works, 528-30 Woodbridge St., E., Detroit, Mich.

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

STANDARD PET COCKS

ACORN Brass Mfg. Co., 51 N. Peoria St., Chicago, Ill.

AMERICAN Brass & Iron Co., Detroit, Mich.
(See page 211.)

AMERICAN Lubricator Co., Summit Ave. & Wabash Ry., Detroit, Mich.

BELFIELD Co., H., 435 N. Broad St., Philadelphia, Pa.

BELKNAP Mfg. Co., Bridgeport, Conn.

BUCKEYE Iron & Brass Works, 324 E. Third St., Dayton, O.

CRANE Co., 519 S. Canal St., Chicago, Ill.

CRUM-WILEY Mfg. Co., Peru, Ind.

DETROIT Brass Works, 2000 Brooklyn Ave., Detroit, Mich.

DETROIT Lubricator Co., Detroit, Mich.
(See page 231.)

EAGLE Brass Works, Dubois & Franklin Sts., Detroit, Mich.

EDELMANN & Co., E., 225 W. Illinois St., Chicago, Ill.

GREER, Frederic, 525 W. Van Buren St., Chicago, Ill.

HAYDENVILLE Co., Haydenville, Mass.

HOMER Brass Works, 231 Race St., Philadelphia, Pa.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

JARECKI Mfg. Co., Erie, Pa.

KELLY & Jones Co., Greensburg, Pa.

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O.

McNAB & Harlin Mfg. Co., 56 John St., New York, N. Y.

McRAE & Roberts Co., 221-35 Campbell Ave., Detroit, Mich.

MICHIGAN Lubricator Co., 661-73 Beaubien St., Detroit, Mich.

MORGAN Mfg. Co., John St., Newport, R. I.

NATIONAL Brass Mfg. Co., 191-93 Mill St., Rochester, N. Y.

NOLTE Brass Co., Springfield, O.

POWELL Co., Wm., 2521-31 Spring Grove Ave., Cincinnati, O.

QUEEN City Brass & Iron Works, Spring Grove Ave., Cincinnati, O.

REGESTER'S Sons Co., J., Holliday & Saratoga Sts., Baltimore, Md.

ROBERTS Brass Mfg. Co., 1395-1407 Fort St., W., Detroit, Mich.

SCHAEFFER & Budenberg Mfg. Co., Brooklyn, N. Y.

SOUTH Park Mfg. Co., Port Huron, Mich.

STANDARD Brass Works, 528-30 Woodbridge St., E., Detroit, Mich.

SWIFT Lubricator Co., Elmira, N. Y.

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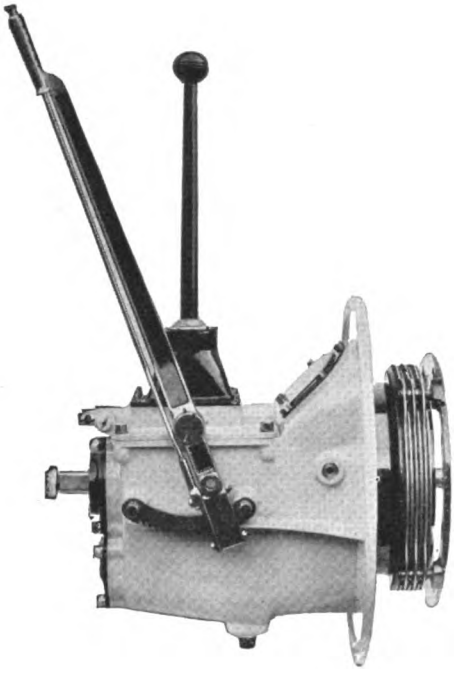

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Built by the foremost specialists in this branch of the industry, who thru fourteen years of strict adherence to high ideals have made their product known as

"THE RECOGNIZED STANDARD"

by which others are measured

Warner Products give to the motor car purchaser lasting service and absolute satisfaction and to the motor car manufacturer the purchaser's everlasting good will.

TRANSMISSIONS
DIFFERENTIALS
STEERING GEARS
CLUTCHES

WARNER GEAR CO.

Muncie, Ind.

DETROIT OFFICE, FORD BUILDING

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COCKS (Continued)

STANDARD PET COCKS (Continued)

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St., & C., B. & Q. R. R., Chicago, Ill.
(See page 293.)

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

COILS

PIPE COILS

NATIONAL Pipe Bending Co., River & Lloyd Sts., New Haven, Conn.

SPARK COILS

(See also Systems, Single Spark Ignition)

AMERICAN Coil Co., Foxboro, Mass.

AMPCO—See S-M Novelty Mfg. Co.

AUTOCOIL Co., 132 Seventh St., Jersey City, N. J.

BLACKBURN - ALLEN CO., Dayton, O. "Noxon."

BOSCH Magneto Co., 223 W. 46th St., New York, N. Y.

CONNECTICUT Telephone & Electric Co., Meriden, Conn.
(See page 401.)

CROWE—See Lisle Mfg. Co.

DAYTON-DICK Co., Quincy, Ill.

DOW Mfg. Co., 131 Adams St., Braintree, Mass.

HEINZE Electric Co., Lowell, Mass.
(See page 479.)

HOOSIER Coil Co., 116-20 E. Jefferson Blvd., South Bend, Ind.

J. & B. Mfg. Co., 65 Eagle St., Pittsfield, Mass.

K-W Ignition Co., 2833 Chester Ave., Cleveland, O.

KINGSTON—See Kokomo Electric Co.

KNOBLOCK-HEIDEMAN Mfg. Co., Sample St. & Vistula Ave., South Bend, Ind. "Quick Action."

KOKOMO Electric Co., 1415 Webster St., Kokomo, Ind. "Kingston."

LINDSLEY & Allen Electric Co., 257-59 Eddy St., Providence, R. I. "Solocoil."

LISLE Mfg. Co., Clarinda, Ia. "Crowe."

MENOMINEE Electric Mfg. Co., Menominee, Mich.

NATIONAL Coil Co., Lansing, Mich.

NEW York Coil Co., 338-40 Pearl St., New York, N. Y.

NOXON—See Blackburn-Allen Co.

ORSWELL Igniter Co., 37 Haverhill St., Boston, Mass. "Puritan."

PITTSFIELD Spark Coil Co., Dalton, Mass.
(See page 127.)

PURITAN—See Orswell Igniter Co.

QUICK ACTION—See Knoblock-Heideman Mfg. Co.

S. M. Novelty Mfg. Co., 52d St. & Baltimore Ave., Philadelphia., Pa. "Ampco."

SCHUG Electric Mfg. Co., 326 Jefferson Ave., Detroit, Mich.

SOLOCOIL—See Lindsley & Allen Electric Co.

SPLITDORF Electrical Co., Newark, N. J.
(See page 161.)

WELLS Mfg. Co., R. C., Fond du Lac, Wis.

WESTERN Electric Co., 463 West St., New York, N. Y.

WILLIAMS, E. Q., 535-39 S. Clinton St., Syracuse, N. Y.

COLLECTORS

COMMERCIAL COLLECTORS

MOTOR & Accessories Adjustment Co., National Life Bldg., Chicago, Ill.
(See page 490.)

COLORS

COACH COLORS

(See Paints and Colors)

COLUMNS

WATER COLUMNS AND BOILER ALARMS

RELIANCE Gauge Column Co., 45 E. Prospect St., Cleveland, O.

COMMUTATORS

ELECTRIC MOTOR COMMUTATORS

CAMERON Electrical Mfg. Co., Ansonia, Conn.

COLUMBIA Machine Works & Malleable Iron Co., Chestnut St. & Atlantic Ave., Brooklyn, N. Y.

EUREKA Co., North East, Pa.
(See page 257.)

HOMER Commutator Co., 4748 Hough Ave. N. E., Cleveland, O.

SPARK COMMUTATORS

(See Timers, Ignition)

COMPOSITION

INSULATING COMPOSITION

(Substitute for Hard Rubber)

BAKELITE-DILECTO—See Continental Fibre Co.

CONDENSITE—See Duranoid Mfg. Co.

CONDENSITE Co. of America, Belleville Ave., Glen Ridge, N. J.

Complete Index to Classification appears on Pages 8 to 26.

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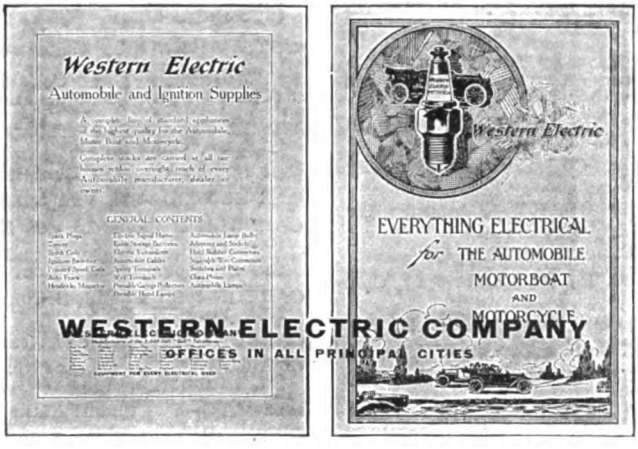

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Our ignition goods are manufactured by the
PITTSFIELD SPARK COIL COMPANY

"SAVE TIME AND FREIGHT"

DYNAMOS-MOTORS WESTERN ELECTRIC COMPANY CABLE-TELEPHONES-SUPPLIES

"TELEPHONE OUR NEAREST HOUSE"

Western Electric Company

New York, Buffalo, Philadelphia, Boston, Pittsburgh, Cleveland, Atlanta, Richmond, Savannah, New Orleans, Houston, Dallas, Chicago, Milwaukee, Indianapolis, Detroit, Cincinnati, St. Louis, Kansas City, Omaha, Oklahoma City, Denver, Minneapolis, St. Paul, San Francisco, Oakland, Los Angeles, Salt Lake City, Seattle, Portland, Montreal, Toronto, Winnipeg, Calgary, Vancouver, Edmonton, London, Paris, Berlin, Antwerp, Milan, Rome, Johannesburg, Sydney, St. Petersburg, Vienna, Buenos Ayres, Tokyo

EQUIPMENT FOR EVERY ELECTRICAL NEED

"MEMBER OF" SERVICE THE SOCIETY FOR ELECTRICAL DEVELOPMENT INC. NEW YORK SAFETY EFFICIENCY ECONOMY

"DO IT ELECTRICALLY"

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COMPOSITION (Continued)

INSULATING COMPOSITION (Continued)

CONTINENTAL Fibre Co., Newark, Del. "Bakelite-Dilecto." (See page 165.)

CUTLER HAMMER Mfg. Co., Milwaukee, Wis. "Thermoplax." (See page 191.)

DICKINSON Mfg. Co., ft. Mechanic St., Springfield, Mass. "Sternoid," "Stern-Condensite," "Stern-Asbestos."

DURANOID Mfg. Co., 213-19 Chestnut St., Newark, N. J. "Condensite."

ELECTROSE Mfg. Co., 70 Washington St., Brooklyn, N. Y.

GENERAL Insulate Co., 1008-14 Atlantic Ave., Brooklyn, N. Y. "Hi-Heet."

HI-HEET—See General Insulate Co.

LOVERING Co., C. P., (E. Cambridge), Cambridge, Mass.

SPECIALTY Mfg. Co., Hoosick Falls, N. Y.

STERN-ASBESTOS—See Dickinson Mfg. Co.

STERN-CONDENSITE—See Dickinson Mfg. Co.

STERNOID—See Dickinson Mfg. Co.

THERMOPLAX—See Cutler-Hammer Mfg. Co.

COMPOUNDS

ANTI-FREEZING COMPOUNDS

BLIZZARD—See Globe Soap Co.

BLUE Ribbon Mfg. Co., 27 Baldwin St., (Charlestown), Boston, Mass. "Premium."

CINCINNATI Oil Works Co., Cincinnati, O. "Wizard."

ESY Mfg. Co., 1466 Michigan Ave., Chicago, Ill. "Non-Freezo."

FREZENOT—See Rub-On Mfg. Co.

GLOBE Soap Co., Cincinnati, O. "Blizzard."

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

HORSEY Mfg. Co., 6104 Euclid Ave., Cleveland, O.

IMPERIAL Oil Co., 3124 Locust St., St. Louis, Mo. "Marvin."

JEWEL—See Wadsworth-Howland Co.

MARVIN—See Imperial Oil Co.

LUBRO Oil Co., 116 Prospect Ave., N. W., Cleveland, O.

NON-FREEZO—See Esy Mfg. Co.

NORTHWESTERN Chemical Co., Marietta, O. "Thermite." (See page 131.)

PREMIUM—See Blue Ribbon Mfg. Co.

RUB-ON Mfg. Co., 89 Brayton St., Buffalo, N. Y. "Frezenot."

THERMITE—See Northwestern Chemical Co.

WADSWORTH-HOWLAND Co., 225 Carpenter St., Chicago, Ill. "Jewel."

WIZARD—See Cincinnati Oil Works Co.

WONDER WORKER—See Hall-Thompson Co.

CARBON REMOVING COMPOUNDS

(See also Removers, Carbon; also Machines, Motor Decarbonizing)

AMERICAN Carboneter Co., 1514 Michigan Ave., Chicago, Ill. "Carboneter."

ARROW—See Peterson Co.

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Destroyo." (See page 131.)

AUTOPOWER—See Lakewood Chemical Co.

BLUE Ribbon Mfg. Co., 27 Baldwin St., (Charlestown), Boston, Mass. "Premium."

BOYER Chemical Laboratory Co., 8 E. Michigan St., Chicago, Ill.

C-R Supply Co., 410 Elm St., Ottawa, Kans.

CAR-BON-GO—See Van Tilburg Oil Co.

CARBOLIDE Chemical Co., Monrovia, Md.

CARBON Cleaning Compound Co., 207 N. 12th St., St. Louis, Mo. "Four Sees."

CARBON-NOT Chemical Co., 271 W. 87th St., New York, N. Y.

CARBONETER—See American Carboneter Co.

CHAMBERLAIN Co., Sixth Ave. & Grant St., Pittsburgh, Pa. "Desolvo."

DESOLVO—See Chamberlain Co.

DESTROYO—See Atlas Auto Supply Co.

DETROIT White Lead Works, 530-60 Milwaukee Ave., E., Detroit, Mich.

DIAMOND Specialty Co., Indianapolis, Ind.

ENGINETONE—See McCormick Mfg. Co.

FOUR SEES—See Carbon Cleaning Compound Co.

FRENCH Compression Fluide Co., 25 S. Allen Ave., Pasadena, Cal.

HALL-THOMPSON Co., Hartford, Conn. "Magic," "Wonder Worker."

HARVEY Chemical Co., 216 N. Fifth St., Lafayette, Ind.

HOLLINGSHEAD Co., R. M., Camden, N. J. "Whiz."

HORSEY Mfg. Co., 6104 Euclid Ave., Cleveland, O.

INDIANAPOLIS Mfg. & Sales Co., 2305 N. Delaware St., Indianapolis, Ind. "Leo."

INTER-TUBE Chemical Co., Schofield Bldg., Cleveland, O.

INTERSTATE Mfg. Co., Wollaston, Mass. "M. H. B."

JEWEL—See Wadsworth-Howland Co.

JIFFY Specialty Co., McKeesport, Pa.

KORINE Carbon Remover Co., 60 South St., Boston, Mass.

KREMBS & Co., 173 N. Green St., Chicago, Ill. "Purgcarbon."

LAKEWOOD Chemical Co., Citizens Bldg., Cleveland, O. "Autopower."

LEO—See Indianapolis Mfg. & Sales Co.

LOMASNEY & Bubb, 72 Adams St., E., Detroit, Mich.

M. H. B.—See Interstate Mfg. Co.

McCORMICK Mfg. Co., First & Sears Sts., Dayton, O. "Enginetone."

MAGIC—See Hall-Thompson Co.

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LIGGETT SPRINGS LIGGETT

SPRINGS

Open Hearth Carbon—Chrome Vanadium

The only manufacturer in the country using molten lead for heat treating springs. The results justify the expense. All springs tested by specially designed machines.

AXLES

Front—I-beam and square beds for both pleasure and commercial vehicles. Roller bearings.

Rear—Chain Drive—I-beam or square beds. Complete with hubs, roller bearings, brakes, sprockets and strut rods.

Forgings—Fully equipped for drop hammer and forge machine work.

Our product is the result of exhaustive study and research by both scientific and practical men skilled in the various arts.

Inquiries cheerfully answered.

LIGGETT SPRING & AXLE CO.

MONONGAHELA, PA.

LIGGETT AXLES LIGGETT

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COMPOUNDS (Continued)

CARBON REMOVING COMPOUNDS (Continued)

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Radium."
(See page 449.)

MOTO Motor Tonic Co., Wichita, Kans.

NATIONAL Mfg. Co., 124 N. Edwards St., Kalamazoo, Mich.

NONCARBENE Co., 1765 Broadway, New York, N. Y.

NORTHWESTERN Chemical Co., Marietta, O. "Carbonox."
(See page 131.)

O-LAX—See Wilkes & Grant Co.

ORIENT Chemical Co., Gumbel Bldg., Kansas City, Mo.

OROLO Mfg. Co., Louisville, Ky.

OWL—See Western Chemical Mfg. Co.

PANAMA Oil & Grease Co., 159-61 W. 51st St., New York, N. Y. "Wheatley."

PEARSON Carbon Remover Co., 809 Woodward Ave., Detroit, Mich.

PEERLESS Mfg. Co., 102d & Kempton Sts., Cleveland, O.

PETERSON Co., T. J., Lees Bldg., Chicago, Ill. "Arrow."

PREMIUM—See Blue Ribbon Mfg. Co.

PREST-O-LITE Co., 1400 Speedway, Indianapolis, Ind.
(See page 515.)

PURGCARBON—See Krembs & Co.

RADIUM—See Milwaukee Auto Specialty Co.

RELIABLE Cement Co. (E. Akron), Akron, O.

T. A. D.—See Toledo Auto Devices Co.

THERMAL Efficiency Co., Aldan, Pa. "Thermo."

THERMO—See Thermal Efficiency Co.

TOLEDO Auto Devices Co., Gardner Bldg., Toledo, O. "T. A. D."

VAN CLEEF Bros., 7709-11 Woodlawn Ave., Chicago, Ill.

VAN TILBURG Oil Co., 2424-28 University Ave. S. E., Minneapolis, Minn. "Car-Bon-Go."

WADSWORTH-HOWLAND Co., 225 Carpenter St., Chicago, Ill. "Jewel."

WESTERN Chemical Mfg. Co., 151 Sixth St., Milwaukee, Wis. "Owl."

WHEATLEY—See Panama Oil & Grease Co.

WHIZ—See Hollingshead Co.

WILKES & Grant Co., 601 E. Broadway, Louisville, Ky. "O-Lax."

WONDER WORKER—See Hall-Thompson Co.

WORKO Co., 1616 Winslow St., Racine, Wis.

CHEMICAL PLATING COMPOUNDS

(See also Polishes, Metal; also Enamels, Brass.)

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Slikup."
(See page 133.)

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Silver Quick."
(See page 131.)

BLUE Ribbon Mfg. Co., 27 Baldwin St., (Charlestown), Boston, Mass. "Premium."

DOZIT—See Kirk Mfg. Co.

FOREST City Sales Co., Fremont, Neb. "Quick Knick."

GUN Metal Finish Co., Main & Water Sts., Decatur, Ill.

JUSTICE Co., A. R., 607 Chestnut St., Philadelphia, Pa. "U-Kan-Plate."

KIRK Mfg. Co., Gumbel Bldg., Kansas City, Mo. "Dozit."

NORTHWESTERN Chemical Co., Marietta, O. "Sil-Ver-Ol."
(See page 131.)

PILLSBURY Mfg. Co., 1206 Hennepin Ave., Minneapolis, Minn. "White Way."

PREMIUM—See Blue Ribbon Mfg. Co.

QUICK KNICK—See Forest City Sales Co.

SIL-VER-OL—See Northwestern Chemical Co.

SILVER QUICK—See Atlas Auto Supply Co.

SLIKUP—See Arnold, N. B.

U-KAN-PLATE—See Justice Co.

VAN TILBURG Oil Co., 2424-28 University Ave. S. E., Minneapolis, Minn. "Wang."

WANG—See Van Tilburg Oil Co.

WHITE WAY—See Pillsbury Mfg. Co.

GLASS WIND SHIELD COMPOUNDS

(For keeping glass clear in rain or fog; For Mechanical Cleaners—See Cleaners, Glass Wind Shield)

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "See-Kleer."
(See page 131.)

BLUE Ribbon Mfg. Co., 27 Baldwin St., (Charlestown), Boston, Mass. "Premium."

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

KLEAR-VIEU Co., 1789 Broadway, New York, N. Y.
(See page 133.)

PREMIUM—See Blue Ribbon Mfg. Co.

RELIABLE Cement Co. (E. Akron), Akron, O.

SEE-KLEER—See Atlas Auto Supply Co.

VAN TILBURG Oil Co., 2424-28 University Ave. S. E., Minneapolis, Minn. "Wang."

WANG—See Van Tilburg Oil Co.

WONDER WORKER—See Hall-Thompson Co.

PUNCTURE SEALING COMPOUNDS

A. B. C.—See Pneumatic Tire Fluid Co.

BAER Mfg. Co., North American Bldg., Philadelphia, Pa. "Tireen."

BUFFALO Specialty Co., 375 Ellicott St., Buffalo, N. Y. "Rubberstone."

DERRICKSON Mfg. Co., 217 W. Main St., Muncie, Ind. "No-Air-Out."

FIBER Mfg. Co., 1649 Court Pl., Denver, Colo. "Joy-Ride."

INTERSTATE Puncture Proof Co., Gas & Electric Bldg., Denver, Colo.

JIFFY Specialty Co., McKeesport, Pa.

JOY-RIDE—See Fiber Mfg. Co.

KOR-KER—See Puncture Cure Sales Co.

L-TY-TO—See Schofield Laboratories Co.

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Chemical Accessories

For the Motor Car

GERMAN RADIATOR COMPOUND
(Stops the Leaks)
SILVER PLATING
(Easier to apply than one job of polish)
(Lasts six months.)
CYLINDER ENAMELS
(Dull Black, Auto Gray, Gloss Black)
ALUMINUM ENAMEL
(Heat Resisting.)
HARD RUBBER ENAMEL
(Air Drying Black for lamps or other parts. Gloss or Semi-Gloss)
RIENIE VALVE GRINDING COMPOUND
(Grinds Fast. Leaves smoothest seat.)
MOHAIR WATERPROOFING & DRESSING
(Guaranteed not to stiffen Mohair)
LEATHER & PANTASOTE DRESSING
MOHAIR CLEANER
TYRE RE-NU
(Preserves the rubber, makes the tires look new)
BODY RE-NU
(Free from oil. Dries quickly on metal bodies.)
FORD REFINISHING OUTFIT
(Complete assortment of paints for Ford cars.)

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DURKEE-ATWOOD CO.
MINNEAPOLIS, MINN. U.S.A.

GUARANTEED TIRE-DOH PRODUCTS

Sold on a Money-back Guarantee to Dealer and Consumer

Every One a Necessity For the Man Who Drives a Car

Tire-Doh—Easiest and cheapest puncture and blow-out repairer, $1.00.
Day Tire Valve, Set of 5—50c.
Silver Quick—$1.00.
Stop That Radiator Leaking—50c.
No More Rust Rim Paint—50c., 85c.
Chemico Blowout Patch—50c., 75c., $1.00, $1.25.
Blac-Namel—75c.
Ever Wear Nickel Polish—25c., 50c., 75c., $1 25.
Body Gloss—50c., 85c., $1.50, $2.50.
X-Ray Top Dressing—75c., $1.25, $2.00.
No-Leak Top Dressing—75c., $1.25, $2.00.
Sunshine Metal Polish—25c., 50c., 75c., $1.25.
See-Kleer—50c.
Metal-Lac—75c.
Destroy-O Carbon Remover—75c.
Preserv-O Tire Paint—50c., $1.00, $1.75. $3.00.
Renew-O Leather Dressing—75c., $1.25, $2.00.
Nu-Stain Lining Dye—50c., 85c.
Sta-On Engine Paint—40c., 75c.
Send for booklet describing products in detail and write for our special introductory offer.

Atlas Auto Supply Company
3240 W. Lake Street **CHICAGO, ILL.**

EVERY LIVE MOTORIST CARRIES

SE-MENT-OL

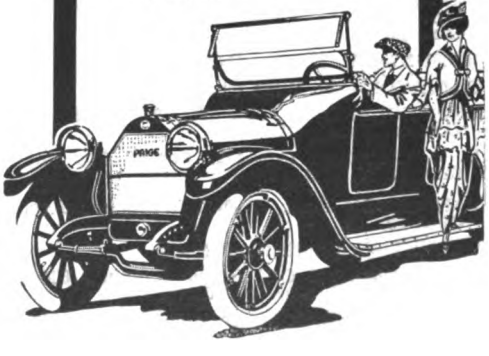
The original automatic radiator cement

"Finds the leak and fixes it"

Live dealers not only carry Se-ment-ol, but the rest of the popular "Chemically Correct" line.

THE NORTHWESTERN CHEMICAL CO. — AUTOMOBILE CHEMICALLY CORRECT SPECIALTIES — MARIETTA, OHIO.

Se-Ment-Ol
Radiator Cement
Carbonox
Carbon Remover
Brass-Kote
Air Drying Enamel
Thermite
Anti-Freeze
Norwesco
Top Dressing
Never-Burn
Engine Enamel
Never-Rust
Rim Paint
Tire-Lac
Tire Paint
Gear-Silence
Quieting Lubricant
Norwesco
Valve Grinding Compound
Sil-Ver-Ol
Silver Plating Solution
Kl-Ens-Ol
Liquid Soap
Dermalene
Mechanics' Hand Soap
Norwesco
Ford and Small Car Painting Outfit



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COMPOUNDS (Continued)

PUNCTURE SEALING COMPOUNDS (Continued)

MEND-A-LEAK—See Springfield Mend-a-Leak Co.

NO-AIR-OUT—See Derrickson Mfg. Co.

PNEUMATIC Tire Fluid Co., 1732-50 Wazee St., Denver, Colo. "A. B. C."

PUNCTURE Cure Sales Co., 12 Bridge St., Newark, N. J. "Kor-Ker."
(See page 133.)

PUNCTUREMEND Co., 1220 W. Sixth St., Cleveland, O.

RUBBERSTONE—See Buffalo Specialty Co.

SCHOFIELD Laboratories Co., 2619 Lexington Ave., Kansas City, Mo. "L-Ty-To."

SEALO Tire Co., 14 E. Jackson Blvd., Chicago, Ill.

SIN-TI Rubber Co., Home Life Bldg., Washington, D. C.

SPRINGFIELD Mend-A-Leak Co., Springfield, O. "Mend-A-Leak."

TIREEN—See Baer Mfg. Co.

TURNER-BIRDSEL Co., Springfield, O.

RADIATOR CLEANING COMPOUNDS

APEX—See U. S. Compound Co.

BANNER—See Cortland Specialty Co.

C-R Supply Co., 410 Elm St., Ottawa, Kans. "Radi-No-Leak."

COLZA Chemical Co., Mutual Life Bldg., Buffalo, N. Y.

CORTLAND Specialty Co., 174-78 Railroad St., Cortland, N. Y. "Banner."

DECALCIFIER—See Milwaukee Auto Specialty Co.

FIELD Auto Compound Mfg. Co., Auburn, Me.

FLUFF-FOE—See Garratt-Callahan Co.

GARRATT-CALLAHAN Co., 37 S. Clinton St., Chicago, Ill. "Fluff-Foe."

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

KETCHUM, H. E., 11-13th St., Whitestone, N. Y. "Young's."

LUX Co., L. A., Canton, O.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Decalcifier."
(See page 449.)

RADI-NO-LEAK—See C-R Supply Co.

RADIATOL—See Wills Chemical Co.

SUTHERLAND & Co., P., 232 Milk St., Boston, Mass. "Velvet."

U. S. Compound Co., 1425 Seneca St., Buffalo, N. Y. "Apex."

VAN CLEEF Bros., 7709-11 Woodlawn Ave., Chicago, Ill.

VELVET—See Sutherland & Co.

WILLS Chemical Co., Board of Trade Bldg., Wheeling, W. Va. "Radiatol."

WONDER WORKER—See Hall-Thompson Co.

YOUNG'S—See Ketchum, H. E.

TIRE FILLING COMPOUNDS

AMERICAN Kushion-Kore Tire Co., 65 Main St. Buffalo, N. Y. "Kushion-Kore."

CARTER-BELL Mfg. Co., Morris Ave., Millburn, N. J.

CLARKS Resilient Tire Filler Co., Thomasville, Ga.

CUMBERLAND—See New York Tire Filler Co.

DAHL Punctureless Tire Co., 501 First St., N. E., Minneapolis, Minn.

ESSENKAY Products Co., 543 Orleans St., Chicago, Ill.

KUSHION-KORE—See American Kushion-Kore Tire Co.

LASTIC-AIR Co. of America, Whirlpool St. & Bath Ave., Niagara Falls, N. Y.

MILLER'S Inner Tire Core Co., 14th & Clifton Sts., Washington, D. C.

MINDEASE Co., 119 N. Tenth St., Louisville, Ky.

NATIONAL Rubber Filler Co., Midlothian, Texas.
(See page 133.)

NATIONAL Tire Filler Co., 1415 Scribner Ave., N. W., Grand Rapids, Mich.

NEW York Tire Filler Co., 204-06 W. 75th St., New York, N. Y. "Cumberland."

NEWMASTIC Co., 151 W. 68th St., New York, N. Y.

PATENT Rubber Co., 1926 Broadway, New York, N. Y.

PERFECTION Filler Co., Middlesex Ave., Somerville, Mass.

RUBERNIX Mfg. Co., 329 Broadway, Toledo, O.

ZILIO Mfg. Co., Unity Bldg., Chicago, Ill.

TIRE PRESERVING COMPOUNDS

AMERICAN Para Rubber Co., 6727 S. Broadway, St. Louis, Mo. "Paruco."

BIGGER Rubber Preservative Co., 567 Washington St., Buffalo, N. Y.

LASTO Chemical Co., 229-31 W. 42d St., New York, N. Y.

PARUCO—See American Para Rubber Co.

TIRE REPAIR COMPOUNDS

(For filling cuts in outer casings)

AMERICAN Para Rubber Co., 6727 S. Broadway, St. Louis, Mo. "Paruco."

AMERICAN Tire & Rubber Co., 70-78 Beach St., Akron, O. "Stickfast."

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Tire-Doh."
(See page 131.)

BESTYET—See St. Louis Rubber Cement Co.

C. O. T. GUM GUM—See Tingley & Co.

COX, David H., Chestnut St., Roselle, N. J.

CUT-WELD—See Keystone Rubber Mfg. Co.

EMPIRE Rubber & Tire Co., Mulberry St., & Clinton Ave., Trenton, N. J.

FIRESTONE Tire & Rubber Co., Akron, O.

GOODRICH Co., B. F., Akron, O. "Seal-Tite."

GRAY Specialty Co., 148 Avon Ave., Newark, N. J. "Selbst-Gemacht."

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

HAZEN-BROWN Co., Court St., Brockton, Mass. "Nu-Tread."

JIFFY—See Johnstown Rubber Co.

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SLIKUP SPECIALTIES

"THE ORIGINAL LINE"

ITS MERITS PROVED BY ITS MANY IMITATIONS

SLIKUP FOR RUBBER.	PRESERVES TIRES
SLIKUP ENGINE ENAMEL	HEAT RESISTING
SLIKUP ALUMINUM PAINT	WITHSTANDS EXPOSURE
SLIKUP AUTO SOAP	ONLY 30 PER CENT MOISTURE
SLIKUP HAND CLEANER	ANTISEPTIC AND QUICK ACTING
SKIKUP CREAM POLISH	FOR BRASS AND NICKEL
SLIKUP CLEAR LACQUER	PREVENTS TARNISH
SLIKUP METAL FINISH	BLACK FINISH FOR LAMPS
SLIKUP SILVER FINISH	SILVER PLATES BRASS & COPPER
SLIKUP ENAMEL TOP DRESSING	WATERPROOFS
SLIKUP MOHAIR TOP CLEANER	CLEANS TOPS AND COVERS
SLIKUP TOP LINING DYE	REFINISHES
SLIKUP LEATHER-KOTE	RENEWS OLD LEATHER
SLIKUP RIM PAINT	PREVENTS RUST
SLIKUP BODY POLISH	FOR DULL BODIES
SLIKUP AUTO VARNISH	TRANSPARENT & COLORS

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6% TONIC **Kor-Ker** PUNCTURE CURE 94% AIR

TRADE MARK
Formula Patented

To get there and get back you must rely on the stability of your tires.

We guarantee Kor-Ker
NOT A FILLER—KEEPS THE TIRES HARD

Preserves the Tubes
Increases Tire Mileage 50%

Will not interfere with vulcanizing
Heals Instantly Slow Leaks and Punctures

KOR-KER PUNCTURE CURE is put up in four sizes—one box required for each tire.

Size	Tires		Set of	
1, for all 3 and 3½"		$2.00	4...	$ 8.00
2, for all 4 and 4½"		2.50	4...	10.00
3, for all 5 and 5½"		3.50	4...	14.00
M, Motorcycles		1.50	2...	3.00
Injecting gun				.75

(Can be installed with a grease gun properly cleaned.)

Puncture Cure Sales Co.

Main Office and Factory,
12 Bridge St., Newark, N. J.

Avoid Danger

USE "KLEAR-VIEU"

FOR RAIN

Without Klear-Vieu

Using Klear-Vieu

Klear-Vieu completely overcomes one of the most dangerous conditions which confronts the driver of a motor car, the locomotive engineer, the motorman and pilot. Applied to glass or mica it evenly sheds rain, snow, frost or moisture, permitting a continuously clear view.

25 Cents a Can

Get at Your Dealers or Send Twenty-five Cents for One Can to

KLEAR-VIEU COMPANY, Inc.
1789 Broadway, New York, U. S. A.

DEALERS! AGENTS!

Investigate This at Once.

NATIONAL RUBBER TIREFILLER is the livest accessory on the market today, and offers an exceptional opportunity for a good man in your section to get into a big paying business. The field is unlimited—every car owner is a prospect—it has been proven a perfect success beyond the least doubt—has been sold all over the United States for the past three years. We are putting on a big advertising campaign and will help you sell it. Let us give you full particulars and sample. Write at once.

National Rubber Filler Co.
Midlothian, Texas

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COMPOUNDS (Continued)

TIRE REPAIR COMPOUNDS (Continued)

JOHNSTOWN Rubber Co., Johnstown, Pa. "Jiffy."

K & W Rubber Co., Orange St., Ashland, O. (See page 429.)

KEYSTONE Rubber Mfg. Co., 125-41 E. 11th St., Erie, Pa. "Cut-Weld."

KNEAD-IT—See M. & M. Mfg. Co.

KUSHION-KORE—See American Kushion-Kore Tire Co.

LEE Tire & Rubber Co., Conshohocken, Pa. "Sure-Lee Fixit."

LIBERTY Rubber Co., Orange, N. J. "Men-Do," "Rubber-Mend," "Treadmend."

M. & M. Mfg. Co., Akron, O. "Knead-it."

MASTIC—See Michelin Tire Co.

MEN-DO—See Liberty Rubber Co.

MICHELIN Tire Co., Milltown, N. J. "Mastic."

MOLD-IT—See Van Cleef Bros.

NARCO—See National Rubber Co.

NATIONAL Cement & Rubber Co., 300-16 S. St. Clair St., Toledo, O.

NATIONAL Rubber Co., 4409 Papin St., St. Louis, Mo. "Narco."

NU-TREAD—See Hazen-Brown Co.

PAGE-LESTER Co., 125 W. Van Buren St., Chicago, Ill. "Titewad."

PARUCO—See American Para Rubber Co.

QUAKER CITY Rubber Co., 629 Market St., Philadelphia, Pa. "Quakerdo."

QUAKERDO—See Quaker City Rubber Co.

RUBBER-MEND—See Liberty Rubber Co.

ST. LOUIS Rubber Cement Co., 8046 Lambdin Ave., St. Louis, Mo. "Bestyet."

SEAL-TITE—See Goodrich Co.

SELBST-GEMACHT—See Gray Specialty Co.

SIMPLEX Auto Specialty Co., 733 Woodward Ave., Detroit, Mich.

STICKFAST—See American Tire & Rubber Co.

SURE-LEE FIXIT—See Lee Tire & Rubber Co.

TINGLEY & Co., C. O., Rahway, N. J. "C. O. T. Gum Gum."

TIRE-DOH—See Atlas Auto Supply Co.

TITEWAD—See Page-Lester Co.

TOLEDO Auto Devices Co., Gardner Bldg., Toledo, O.

TREADMEND—See Liberty Rubber Co.

VAN CLEEF Bros., 7709-11 Woodlawn Ave., Chicago, Ill. "Mold-it."

WONDER WORKER—See Hall-Thompson Co.

VALVE GRINDING COMPOUNDS

AUTO Equipment Co., 32 Hollywood Ave., East Orange, N. J. "Eureka."

BIG 4—See Gray Specialty Co.

BORNSCHEIN & Co., John F., 6304 Wallace St., Chicago, Ill. "E. Z," "Peerless," "X. L."

BRIDGEPORT Wood Finishing Co., New Milford, Conn. "Lithowite."

CARBORUNDUM Co., Niagara Falls, N. Y.

CLOVER Mfg. Co., Norwalk, Conn.

DIAMOND Pulvis Co., 21 Nagle Ave., New York, N. Y.

DURKEE-ATWOOD Co., Minneapolis, Minn. "Rie-Nie." (See page 131.)

E. Z.—See Bornschein & Co.

EUREKA—See Auto Equipment Co.

GRAY Specialty Co., 148 Avon Ave., Newark, N. J. "Big 4."

GRYNDYN—See Stewart & Co.

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker," "Quick-Kut."

HOLLINGSHEAD, Co., R. M., Camden, N. J. "Whiz."

JIFFY Specialty Co., McKeesport, Pa.

LIGHTNING Mfg. Co., Cornish Flat, N. H.

LITHOWHITE—See Bridgeport Wood Finishing Co.

NATIONAL Valgrinok Co., 195 Church St., Newton, Mass. "Valgrinok."

NORTHWESTERN Chemical Co., Marietta, O. "Norwesco." (See page 131.)

NORTON Co., Worcester, Mass.

NORWESCO—See Northwestern Chemical Co.

PEERLESS—See Bornschein & Co.

QUICK-KUT—See Hall-Thompson Co.

RAPIDCUT—See S. B. R. Specialty Co.

RIE-NIE—See Durkee-Atwood Co.

S. B. R. Specialty Co., 17-19 Princeton St., East Orange, N. J. "Rapidcut."

SMITH Machine Works, Winton L., 78 Clinton St., Newark, N. J. (See page 419.)

SMOOTH-CUT Powder Co., Flint, Mich.

STEWART & Co., 171 Broadway, New York, N. Y. "Gryndyn."

VALGRINOK—See National Valgrinok Co.

VAN TILBURG Oil Co., 2424-28 University Ave., S. E., Minneapolis, Minn. "Wang."

WANG—See Van Tilburg Oil Co.

WHIZ—See Hollingshead Co.

WONDER WORKER—See Hall-Thompson Co.

X. L.—See Bornschein & Co.

CONDENSERS

STEAM CONDENSERS

A-Z Co., 530 W. 56th St., New York, N. Y.

CONDUIT

FLEXIBLE CAR WIRING CONDUIT

AUTOFLEX—See National Metal Molding Co.

DURADUCT—See Tubular Woven Fabric Co.

NATIONAL Metal Molding Co., Pittsburg, Pa. "Auto Flex."

TUBULAR Woven Fabric Co., Pawtucket, R. I. "Duraduct."

Complete Index to Classification appears on Pages 8 to 26.

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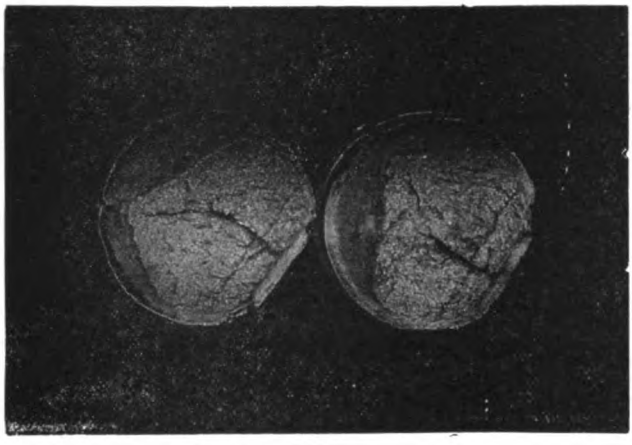
Our Specialties:—



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Wrist Pins and Sleeves
Chain, Etc.

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AMERICAN METAL TREATMENT Co.

ELIZABETH, N. J.

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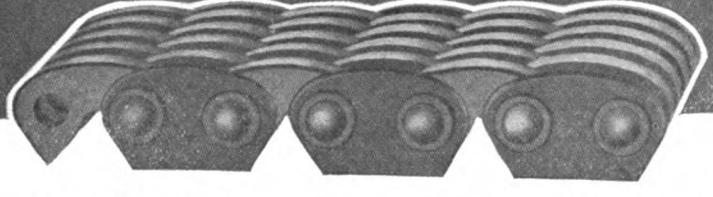

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CONES

BALL CONES

(See Cups, Ball)

CONNECTIONS

BRASS WATER CONNECTIONS

AMERICAN Brass & Iron Co., Detriot, Mich.
(See page 211.)

AMERICAN Tube Products Co., Euclid Ave. E. & Grand Trunk Ry., Detroit, Mich.

GREER, Fredric, 525 W. Van Buren St., Chicago, Ill.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

STANDARD Metalwork Co., 22-40 Prospect St., Thompsonville, Conn.

STANDARD Tool & Mfg. Co., 72 Champlain St., Detroit, Mich.

WELCH Bros., Pontiac, Mich.

WHITLOCK Coil Pipe Co., Hartford, Conn.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

WILKINSON Co., Wm. H., West Medway, Mass.

GAS TUBING CONNECTIONS

COX Brass Mfg. Co., Albany, N. Y.
(See page 357.)

GOODWIN & Kintz Co., Winsted, Conn.

MORGAN Mfg. Co., John St., Newport, R. I.

UNIFORM Seamless Wire Co., 71 Peck St., Providence, R. I.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

STEERING CONNECTIONS

BILLINGS & Spencer Co., Hartford, Conn.

CINCINNATI Ball Crank Co., Cincinnati, O.
(See page 137.)

FOSTER Gear Co., Columbus, O.

HALL Automobile Specialties Co., Boston, Mass. "Hasco."

HASCO—See Hall Automobile Specialties Co.

MICHIGAN Electric Welding Co., 514 Hart Ave., Detroit, Mich.
(See page 596.)

S. & W.—See Schweppe & Wilt Mfg. Co.

SCHWEPPE & Wilt Mfg. Co., Champlain St. & Meldrum Ave., Detroit, Mich. "S. & W."

TIRE PUMP CONNECTIONS

ACORN—See Stevens & Co.

ADJUSTABLE Lighter Co., 18 Pearl St., Newton, Mass. "Larkin."

AUSTIN & Co., H. K., 23 Lincoln St., Reading, Mass.

BELL Pump Co., Detroit. Mich.
(See page 633.)

BOSS—See Stevens & Co.

BULL DOG—See Stevens & Co.

CODMAN & Shurtleff, 120 Boylston St., Boston, Mass.

ECLAIR—See Stevens & Co.

EDELMANN & Co., E., 225 W. Illinois St., Chicago, Ill.

EVERTIGHT—See Smith Bros.

GLEASON-PETERS Air Pump Co., 255-61 Classon Ave., Brooklyn, N. Y.

GLOBE Mfg. Co., Battle Creek, Mich.

GRAB—See Motor Car Equipment Co.

GREER, Fredric, 525 W. Van Buren St., Chicago, Ill.

GURNARD Mfg. Co., Beverly, Mass. "Thumlock."

IDEAL—See Stevens & Co.

JUDD & Leland Mfg. Co., Clifton Springs, N. Y.
(See pages 205 and 479.)

KENO—See Stevens & Co.

LARKIN—See Adjustable Lighter Co.

MAYO Mfg. Co., 58 E. 18th St., Chicago. Ill.
(See page 325.)

MOTOR Car Equipment Co., 55 Warren St., New York, N. Y. "Grab."

NELSON Mfg. Co., A., 564-72 W. Randolph St., Chicago, Ill.

NOERA Mfg. Co., Waterbury, Conn.

OSBORNE & Stephenson Mfg. Co., W. Main St., Plainville, Conn.
(See page 471.)

PERFECT—See Youse Co.

PERFECTION—See Stevens & Co.

ROMORT Valve Co., 701 E. Pike St., Seattle, Wash.

SCHRADER'S Son, A., 783-91 Atlantic Ave., Brooklyn, N. Y.
(See page 441.)

SMITH Bros., 467-69 Main St., Melrose, Mass. "Evertight."

STANDARD Engineering Works, 90 Exchange St., Pawtucket, R. I.

STEVENS & Co., 373 Broadway, New York, N. Y. "Keno." "Swivel K." "Perfection." "Boss." "Bull Dog." "Acorn." "Eclair." "Ideal."
(See page 231.)

SUNDERLAND Mfg. Co., 61 E. 24th St., Chicago, Ill.

SWIVEL K—See Stevens & Co.

THUMLOCK—See Gurnard Mfg. Co.

YOUSE Co., E. S., 46 N. Fifth St., Reading Pa. "Perfect."

CONNECTORS

ACETYLENE LAMP CONNECTORS

(For Rubber Cement—See Tubing, Soft Rubber)

BREEZE Carbureter Co., 250-52 South St., Newark, N. J.

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A FULL line of *TERMINALS*, for ignition starter and lighting systems.

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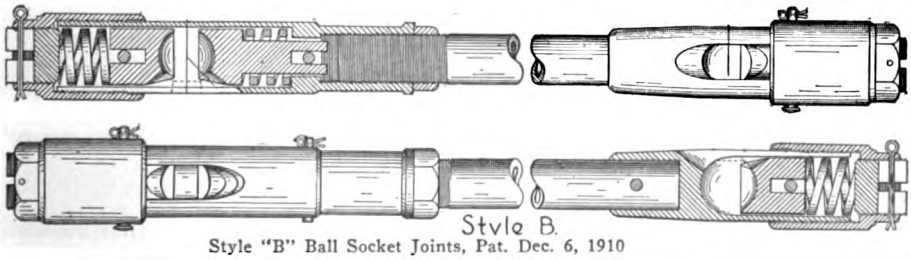

Style "B" Ball Socket Joints, Pat. Dec. 6, 1910

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CONNECTORS (Continued)

ACETYLENE LAMP CONNECTORS (Continued)

PENNFLEX—See Pennsylvania Flexible Metallic Tubing Co.

PENNSYLVANIA Flexible Metallic Tubing Co., Broad & Race Sts., Philadelphia, Pa.

BATTERY CONNECTORS

(See also Terminals, Wire)

AMERICAN Ever Ready Co., 308 Hudson St., New York, N. Y. "Bull Dog."

BARCY-NICHOLSON Co., 845 Fort St., W., Detroit, Mich.

BECCO—See Michigan Motor Specialties Co.

BLISS-CHESTER Co., Providence, R. I. (See page 409.)

BREAZNELL, J. H., 26 Court St., Brooklyn, N. Y. (See page 137.)

BULL DOG—See American Ever Ready Co.

CHICAGO Electric Mfg. Co., 2817 S. Halsted St., Chicago, Ill. "Handy."

FAHNESTOCK Electric Co., 129 Patchen Ave., Brooklyn, N. Y.

FITZGERALD Mfg. Co., Torrington, Conn. "Perfection," "Standard." (See page 219.)

FRANCO—See Interstate Electric Novelty Co.

GOODSON—See Graham Mfg. Co.

GRAHAM Mfg. Co., 94 Point St., Providence, R. I. "Goodson."

HANDY—See Chicago Electric Mfg. Co.

HARVARD Electric Co., 525 W. Van Buren St., Chicago, Ill.

HERZ & Co., 245 W. 55th St., New York, N. Y. (See page 311.)

HI-PO Waterproof Battery Co., 1007 Atlantic Ave., Brooklyn, N. Y.

INTERSTATE Electric Novelty Co., 29 Park Pl., New York, N. Y. "Franco." (See page 139.)

KINSEY Mfg. Co., Toledo, O.

KNOBLOCK-HEIDEMAN Mfg. Co., Sample St. & Vistula Ave., South Bend, Ind.

LOMBARDI Motor Car Co., 67-71 Minerva St., Derby, Conn.

MICHIGAN Motor Specialties Co., 518-20 Woodbridge St. E., Detroit, Mich. "Becco." (See page 137.)

NATIONAL Carbon Co., Cleveland, O.

PERFECTION—See Fitzgerald Mfg. Co.

PERFECTO—See Simplex Auto Specialty Co.

SHAIN, Chas. D., Box 53, Station L., Brooklyn, N. Y. (See page 509)

SIMPLEX Auto Specialty Co., 733 Woodward Ave., Detroit, Mich. "Perfecto."

STANDARD—See Fitzgerald Mfg. Co.

WESTERN Electric Co., 463 West St., New York, N. Y.

ELECTRIC LAMP CONNECTORS

ANCHOR—See Metal Specialties Mfg. Co.

CHICAGO Electric Mfg. Co., 2817 S. Halsted St., Chicago, Ill. "Handy."

CONNECTICUT Telephone & Electric Co., Meriden, Conn. (See page 401.)

CULVER-STEARNS Mfg. Co., Worcester, Mass. (See page 139.)

FRANCO—See Interstate Electric Novelty Co.

HANDY—See Chicago Electric Mfg. Co.

INTERSTATE Electric Novelty Co., 29 Park Pl., New York, N. Y. "Franco." (See page 139.)

METAL Specialties Mfg. Co., 736-38 W. Monroe St., Chicago, Ill. "Anchor."

MORSE, Frank W., 516 Atlantic Ave., Boston, Mass.

ROSCO—See Rosen & Co.

ROSEN & Co., A. W., 610-14 Broadway, New York, N. Y. "Rosco." (See page 139.)

VESTA Accumulator Co., 2100 Indiana Ave., Chicago, Ill.

WARNE-DOUGLAS Co., Bronson, Mich.

WESTERN Electric Co., 463 West St., New York, N. Y.

CONTROLLERS

ACETYLENE LAMP CONTROLLERS

(See also Regulators, Acetylene Pressure.)

CRUM-WILEY Mfg. Co., Peru, Ind.

PREST-O-LITE Co., 1400 Speedway, Indianapolis, Ind. (See page 515.)

ELECTRIC MOTOR CONTROLLERS

(For varying speed of electric vehicles)

CUTLER-HAMMER Mfg. Co., Milwaukee, Wis. (See page 191.)

GENERAL Electric Co., Schenectady, N. Y.

WESTERN Electric Co., 463 West St., New York, N. Y.

WESTINGHOUSE Electric & Mfg. Co. (E. Pittsburg), Pittsburg, Pa.

COOLERS

WATER COOLERS

(See Radiators, Water Cooling)

COPPER

SHEET AND ROD COPPER

(See Brass, Sheet)

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Metal Flexible Lamp Connections,
Complete Metal Flexible Assemblies,
Lighting Switches,
Single Wire Fittings,
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Our No. 77 Plug is the finest made for metal tubing
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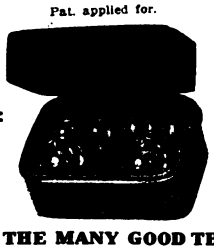

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It will carry extra bulbs safer than the ones in the lamps of the car. Made of extra heavy seamless steel—all other parts Electric Welded. No rivets or solder used in the construction.

The bulbs are securely held in place by a new brass spring locking device, which gives absolute protection against rough handling and vibration.

A new bulb always ready in perfect condition when needed.

Do not confuse our heavy seamless steel case with the cheap pasteboard or wood boxes, which are quickly ruined by moisture or rough handling and are only fit for keeping bulbs on the shelf in a store.

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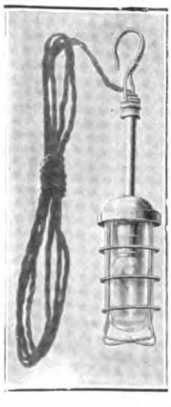
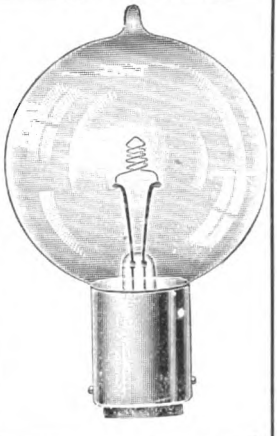
Cambridge, Mass.





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COPPER (Continued)

TUBE COPPER

(See Tubing, Brass)

CORDS

SEAMING CORDS

MEYER & Co., John C., Lowell, Mass.

CORK

BRAKE AND CLUTCH INSERTS

ARMSTRONG Cork Co., 124 23d St., Pittsburg, Pa. (See page 215.)

CORK Insert Co., 164 Federal St., Boston, Mass.

DIAMOND Cork Co., 59 Pearl St., New York, N. Y.

MUNDET & Son, L., King, Ferris & Sullivan Sts., Brooklyn, N. Y.

PADDOCK Cork Co., 1209-17 De Kalb Ave., Brooklyn, N. Y.

SPANISH-AMERICAN Cork Co., 2211 Pennsylvania Ave., Baltimore, Md.

COUNTER-SHAFTS

FINISHED COUNTER-SHAFTS

BALL—See New York Gear Works.

DETROIT Gear & Machine Co., Detroit, Mich. (See page 185.)

DETROIT Standard Gear Co., 742 Woodbridge St., E., Detroit, Mich.

EVANS—See Merchant & Evans Co.

LEFEVER Arms Co., 1 Maltbie St., Syracuse, N. Y.

MERCHANT & Evans Co., Philadelphia, Pa. "Evans."

NEW YORK Gear Works, 56-58 Greenpoint Ave., Brooklyn, N. Y. "Ball." (See page 473.)

RUSSEL Motor Axle Co., North Detroit, Mich. (See page 566.)

SALISBURY Wheel & Mfg. Co., Jamestown, N. Y. (See page 601.)

SHELDON Axle & Spring Co., Wilkes-Barre, Pa. (See page 141.)

TIMKEN-DETROIT Axle Co., Detroit, Mich.

WARNER Mfg. Co., Toledo, O. (See page 243.)

COUPLINGS

HOSE COUPLINGS

(See Clamps, Hose)

MAGNETO COUPLINGS

BOSCH Magneto Co., 223 W. 46th St., New York, N. Y.

CLARK Flexible Coupling Co., 90 West St., New York, N. Y.

SMITH-SERRELL Co., 90 West St., New York, N. Y.

WERNER Coupling Co., 931 Dauphin St., Philadelphia, Pa.

PIPE COUPLINGS

(See Fittings, Pipe)

TUBE COUPLINGS

(See Unions, Tubing)

COVERS

AUTOMOBILE COVERS

(For covering automobiles when in the garage)

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill.

BAILEY Co., R. B., 406 W. Pico St., Los Angeles, Cal.

DAFOE-EUSTICE Co., Jefferson Ave. & Antoine St., Detroit, Mich. "Duk-Bak." (See page 539.)

DUK-BAK—See Dafoe-Eustice Co.

FULTON Bag & Cotton Mills, Atlanta, Ga. "Shuredry."

GREATER N. Y. Auto Cover Co., 3783 Third Ave., New York, N. Y.

HUMPHREYS Sons, R. A., 1021-23 Callowhill St., Philadelphia, Pa.

LANDERS Bros. Co., Dept. A., Toledo, O. (See page 427.)

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

SHUREDRY—See Fulton Bag & Cotton Mills.

WARDEN Co., Geo. J., 6530-34 Carnegie Ave., Cleveland, O.

CORK PULLEY RIM COVERS

ARMSTRONG Cork Co., 124 23d St., Pittsburg, Pa. (See page 215.)

LAMP COVERS

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill.

B. E. Mfg. Co., 444 Broadway, New York, N. Y. (See page 97.)

ECONOMY Stay Co., Jefferson City, Mo.

FALLS City Buggy Top Co., 128-30 S. Floyd St., Louisville, Ky.

GIFFORD & Son, John A., 25 Park Pl., New York, N. Y. "Tompkins."

GILBERT Mfg. Co., New Haven, Conn.

HOPEWELL Bros., Watertown, Mass. (See page 97.)

LANDERS Bros. Co., Dept. A., Toledo, O. (See page 427.)

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SHELDON

SHELDON Products consist of worm gear rear axles, front axles and springs for trucks and pleasure cars, and brake and radius rod equipments for heavy duty trucks.

If SHELDON design evidences a preference for certain type of construction, know that no motive other than ultimate efficiency and service governs us.

SHELDON WORM GEAR REAR AXLES are made in all sizes for pleasure cars, and commercial vehicles ranging in capacity from 1500 lbs. upward to five tons.

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COVERS (Continued)

LAMP COVERS (Continued)

NATHAN Novelty Mfg. Co., 90G. Reade St., New York, N. Y. (See page 209.)

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

PREMIER Auto Novelty Mfg. Co., 375 W. Broadway, New York, N. Y.

TOMPKINS—See Gifford & Son.

WILEY & Son Co., Wm. H., 80 Pliny St., Hartford, Conn.

LEATHER MAGNETO COVERS

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill.

B. E. Mfg. Co., 444 Broadway, New York, N. Y. (See page 97.)

BAILEY Co., R. B., 406 W. Pico St., Los Angeles, Cal.

BAUER-LEWIS Co., 363 Holden Ave., Detroit, Mich.

CAMPBELL—See Perkins Campbell Co.

DAFOE-EUSTICE Co., Jefferson Ave. & Antoine St., Detroit, Mich. "Duk-Bak." (See page 539.)

DETROIT Leather Works, 141-43 E. Lafayette Blvd., Detroit, Mich. (See page 75.)

DUK-BAK—See Dafoe-Eustice Co.

ECONOMY Stay Co., Jefferson City, Mo.

GILBERT Mfg. Co., New Haven, Conn.

HAGER & Son, Chas., 244-46 E. 52d St., New York, N. Y.

HOOVER Co., W. H., New Berlin, O.

LEATHER Products Co., 2268 Spring Grove Ave., Cincinnati, O.

NATHAN Novelty Mfg. Co., 90 G. Reade St., New York, N. Y. (See page 209.)

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

PERKINS Campbell Co., 634 Broadway, Cincinnati, O. "Campbell." (See page 48.)

REINHOLD Belting & Supply Co., 499 Atlantic Ave., Brooklyn, N. Y.

SMITH & Son, James, 40-42 Franklin Ave., Brooklyn, N. Y.

SPRINGFIELD Harness Co., 55-61 Dwight St., Springfield, Mass.

STEVENS & Bro., A. A., 1224 Wabash Ave., Chicago, Ill.

WILEY & Son Co., Wm. H., 80 Pliny St., Hartford, Conn.

OIL HOLE COVERS

APEX—See Lonergan Co.

BAY State Stamping Co., 330 Chandler St., Worcester, Mass. "Bennett," "Handy."

BENNETT—See Bay State Stamping Co.

BOWEN Mfg. Co., Auburn, N. Y. (See page 151.)

CRUM-WILEY Mfg. Co., Peru, Ind.

DETROIT Lubricator Co., Detroit, Mich. (See page 231.)

ELLIOTT Chemical Works, Newton, Mass.

GITS Bros. Mfg. Co., 557 Quincy St. Chicago, Ill.

GREER, Frederic, 525 W. Van Buren St., Chicago, Ill.

HANDY—See Bay State Stamping Co.

LONERGAN Co., J. E., 211-15 Race St., Philadelphia, Pa. "Apex." (See page 507.)

OSGOOD Lubricator Co., J. L., 45 Pearl St., Buffalo, N. Y.

TUCKER, W. H. & C. F., Hartford, Conn. (See page 143.)

WAHLSTROM Tool Co., 346 Carroll St., Brooklyn, N. Y.

WINKLEY Co., Detroit, Mich. (See page 149.)

PAPER SHIPPING COVERS

KENNEDY Car-Liner & Bag Co., Shelbyville, Ind.

SAFEPACK Paper Mills, 411 Court St., Brockton, Mass.

SEINSHEIMER Paper Co., York St. & McLean Ave., Cincinnati, O.

RADIATOR AND HOOD COVERS

(To prevent the water freezing in cold weather)

ALLEN Auto Specialty Co., 1926 Broadway, New York, N. Y. (See page 97.)

ANTIDAM—See Glover Equipment Co.

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill.

AUTO Cape Top Co., 2334 Michigan Ave., Chicago, Ill.

AYRES & Sons, Wm., Cumberland & Third Sts., Philadelphia, Pa.

B. E. Mfg. Co., 444 Broadway, New York, N. Y. (See page 97.)

BONDY Mfg. Co., 3112 Euclid Ave., Cleveland, O. "Tesmer," "Imperial."

BOYER-SCHLISKE Co., 1171 Van Dyke Ave., Detroit, Mich.

CONSERVATOR—See Hudson, John J.

DAFOE-EUSTICE Co., Jefferson Ave. & Antoine St., Detroit, Mich. "Duk-Bak." (See page 539.)

DETROIT Slip Cover Co., 1225 Woodward Ave., Detroit, Mich.

DUK-BAK—See Dafoe-Eustice Co.

GILLIAM Mfg. Co., Canton, O.

GLOVER Equipment Co., Indianapolis, Ind. "Antidam." (See page 421.)

GORDON Co., J. P., 272 N. Fourth St., Columbus, O.

GREATER N. Y. Auto Cover Co., 3783 Third Ave., New York, N. Y.

HANISCH Sons, R., 123-27 N. Halsted St., Chicago, Ill.

HUDSON, John J., 81 Paulding Ave., Tarrytown, N. Y. "Conservator."

IMPERIAL—See Bondy Mfg. Co.

KNAPP Co., A. C., 1735 Mt. Elliott Ave., Detroit, Mich.

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

PREMIER Auto Novelty Mfg. Co., 375 W. Broadway, New York, N. Y.

SIEDER Mfg. Co., 31-33 E. Woodbridge St., Detroit, Mich.

TESMER—See Bondy Mfg. Co.

VEHICLE Top & Supply Co., 3414 Lindell Ave., St. Louis, Mo. "Vesco."

VESCO—See Vehicle Top & Supply Co.

Complete Index to Classification appears on Pages 8 to 26.

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TUCKER POSITIVE LOCK COMPRESSION GREASE CUPS

No. 000—

Pat. Jan. 11th, 1910

POSITIVE LOCK CUP

Fitted with barrel lock. This cup is not a ratchet action, is self-locking in either direction and is in a class alone.

It is designed for the builder of high-grade motor cars who want the best equipment that money can buy to put into their product. Cap member with lock can be fitted to head of spring shackle bolts with minimum expense.

No springs to depress when feeding the lubricant.

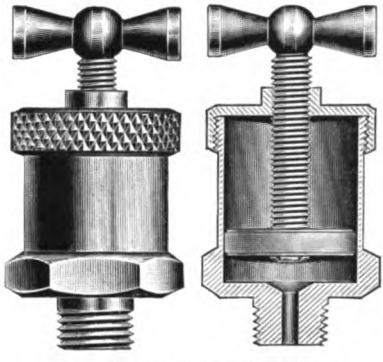
No friction but the grease.

MADE IN THREE SIZES

000	¾	⅛	Pipe
00	1	⅛	"
0	1¼	¼	"

SEND FOR GREASE CUP CATALOGUE

MARINE TYPE



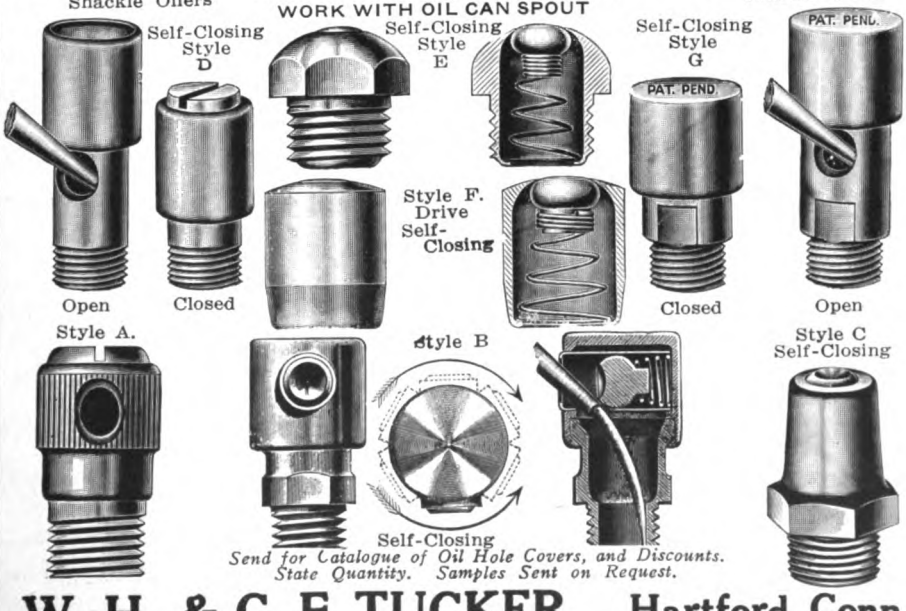
MADE IN THREE SIZES

0000	¼ x 32 5/16 x 32	and ⅛ Pipe
000	⅛ Pipe	
00	⅛ Pipe	

TUCKER OIL HOLE COVERS

THE SAFETY FIRST KIND

WORK WITH OIL CAN SPOUT



Send for Catalogue of Oil Hole Covers, and Discounts. State Quantity. Samples Sent on Request.

W. H. & C. F. TUCKER, Hartford, Conn.

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COVERS (Continued)

SLIP COVERS

(See also Tops, Automobile)

AUTO Protector Co., 58 Tyler St., Springfield, Mass. "Dandyfit."

B. E. Mfg. Co., 444 Broadway, New York, N. Y.
(See page 97.)

BUOB & SCHEU, 401 Court St., Cincinnati, O.

CAMPBELL—See Perkins Campbell Co.

CENTRAL Auto Top Co., 330 N. Illinois St., Indianapolis, Ind.

DANDYFIT—See Auto Protector Co.

GATES Mfg. Co., 530 N. Capitol Ave., Indianapolis, Ind.

GECO—See Glover Equipment Co.

GLOBE Seat Cover Co., Racine, Wis.

GLOVER Equipment Co., Indianapolis, Ind "Geco"
(See page 421.)

KNAPP Co., A. C., 1735 Mt. Elliott Ave., Detroit, Mich.

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

PERKINS Campbell Co., 634 Broadway, Cincinnati, O. "Campbell."
(See page 48.)

PHILLIPS Auto Seat Cover Co., 244-50 W. 49th St., New York, N. Y. "Sure Fit."
(See page 525.)

PREMIER Auto Novelty Mfg. Co., 375 W. Broadway, New York, N. Y.

STANDARD Division Curtain Co., 1338 Race St., Philadelphia, Pa.

SURE FIT—See Phillips Auto Seat Cover Co.

WISCONSIN Auto Top Co., Racine, Wis.

STARTING CRANK COVERS

(See Holders, Starting Crank)

STEERING KNUCKLE COVERS

(See Boots, Steering Knuckle)

STEERING WHEEL COVERS OR GRIPS

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill.

B. E. Mfg. Co., 444 Broadway, New York, N. Y.
(See page 97.)

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J.

EZE-GRIP—See Hayne-Surridge Auto Goods Co.

GORDON Co., J. P., 272 N. Fourth St., Columbus, O.

HAYNE-SURRIDGE Auto Goods Co., 1017 Lucas Ave., St. Louis, Mo. "Eze-Grip."

NATHAN Novelty Mfg. Co., 90 G Reade St., New York, N. Y.
(See page 209.)

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

PARKER-STEARNS & Co., 286 Sheffield Ave., Brooklyn, N. Y.

TIRE COVERS

(See Cases, Tire and Tube)

TOP COVERS

(See also Tops, Automobile)

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill.

B. E. Mfg. Co., 444 Broadway, New York, N. Y.
(See page 97.)

BUOB & SCHEU, 401 Court St., Cincinnati, O.

DETROIT Slip Cover Co., 1225 Woodward Ave., Detroit, Mich.

FALLS City Buggy Top Co., 128-30 S. Floyd St., Louisville, Ky.

GECO—See Glover Equipment Co.

GLOVER Equipment Co., Indianapolis, Ind. "Geco."
(See page 421.)

GORDON Co., J. P., 272 N. Fourth St., Columbus, O.

HANISCH Sons, R., 123-27 N. Halsted St., Chicago, Ill.

LONDON Auto Supply Co., 2540-48 **Wabash** Ave., Chicago, Ill.

MILWAUKEE Trimming Co., 549 E. Water St., Milwaukee, Wis.

NATHAN Novelty Mfg. Co., 90 G. Reade St., New York, N. Y.
(See page 209.)

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

SPRINGFIELD Auto Top & Upholstering Co., 224-30 Dwight St., Springfield, Mass.

VESCO—See Vehicle Top & Supply Co.

CRANKS

SAFETY STARTING CRANKS

CLARK Crank Co., Johnson Bldg., Muncie, Ind.

PERKINS & Son, B. F., 2 Crescent St., Holyoke, Mass.

PROSSER Engineering Co., 2103 W. Superior Ave., Cleveland, O.

R. & B. Mfg. Co., 5525 Woodland Ave., Philadelphia, Pa. "Rohrer."

ROHRER—See R. & B. Mfg. Co.

WINK Mfg. Co., 2100 W. Superior Ave., Cleveland, O.

CRANKSHAFTS

FINISHED OR MACHINED CRANKSHAFTS

(For Crankshafts in the rough—See Forgings, Drop)

ALLISON & Co., Fifth & Market Sts., Chester, Pa.

ATLAS Mfg. Co., Fostoria, O.
(See page 79.)

Complete Index to Classification appears on Pages 8 to 26.

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FINISHED CAM AND CRANK SHAFTS OF SUPERIOR QUALITY

We are in the age of specialization and that is why we are specializing and placing all our hopes of business success on

Cams and Cranks Only

Our new fireproof plant, which is equipped with the latest and best machinery, and with our

Special Testing Machines

of our own design, makes it possible for our organization, composed of expert mechanics, to produce more accurate work.

Estimates Furnished

on forgings finished complete, or finishing only.

THE JACKSON MOTOR SHAFT COMPANY

JACKSON MICHIGAN

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CRANKSHAFTS (Continued)

FINISHED OR MACHINED CRANKSHAFTS (Continued)

AUTO Crankshaft Co, Detroit, Mich
(See page 147.)

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

FORE River Shipbuilding Corp., Quincy, Mass.

GILL & Sons Forge & Machine Works, P. H., Lorraine & Otsego Sts., Brooklyn, N. Y.
(See page 175.)

JACKSON Motor Shaft Co., Jackson, Mich.
(See page 145.)

JOLIET Forge Co., Irving & Franklin Sts., Joliet, Ill.

LELAND-GIFFORD Co., 1025 Southbridge St., Worcester, Mass.

MICHIGAN Crank Shaft Co., Lansing, Mich.
(See page 151.)

MUSKEGON Motor Specialties Co., Muskegon, Mich.
(See page 91.)

NATIONAL Engineering Co., Saginaw, Mich.
(See page 533.)

NORTON Grinding Co., New Bond St., Worcester, Mass.

OBENBERGER Drop Forge Co., Milwaukee, Wis.
(See page 525.)

PARK Drop Forge Co., Cleveland, O.
(See page 79.)

PENINSULA Auto Parts Co., 46 Lafayette Ave., E., Detroit, Mich.

STANDARD Gauge Steel Co., Beaver Falls, Pa.

TINDELL-MORRIS Co., Eddystone, Pa.

UNION Drop Forge Co., 358 W. Indiana St., Chicago, Ill.

WYMAN & Gordon Co., Worcester, Mass.
(See Back Bone.)

CUPS

BALL CUPS AND CONES

ASHLEY Machine Works, 724 University Ave., Rochester, N. Y.
(See page 251.)

AUBURN Ball Bearing Co., 27 Elizabeth St., Rochester, N. Y.
(See page 409.)

BOSSERT Co., Utica, N. Y.
(See page 223.)

BUFFALO Pressed Steel Co., Military Rd. & Lansing St., Buffalo, N. Y.

DETROIT Screw Works, Detroit, Mich.
(See page 347.)

GIER & Dail Mfg. Co., Lansing, Mich.

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O.
(See page 81.)

HARTFORD Machine Screw Co., Hartford, Conn.
(See page 301.)

KONIGSLOW Mfg. Co., Otto, E. 35th St. & Perkins Ave., Cleveland, O.

OAKES Pressed Steel Co., Indianapolis, Ind.

REESE Machine & Tool Works, S., 224-30 W. Main St., Plymouth, Pa.

U. S. Automatic Co., Amherst, O.

WESTERN Automatic Machine Screw Co., Elyria, O.

WORCESTER Pressed Steel Co., Worcester, Mass.
(See page 157.)

OIL AND GREASE CUPS

(See also Lubricators; also Covers, Oil Hole)

ACTIVE—See Sherman Mfg. Co.

AGNER Co., Raymond C., Burlington, Wis. "Simplex."

AJAX—Se Allen Mfg. Co.

ALBANY Lubricating Co., 708-10 Washington St., New York, N. Y. (Grease Cups only.)

ALLEN Mfg. Co., W. D., 133-35 W. Lake St., Chicago, Ill. "Czar," "Columbia," "Peerless," "Gibbs," "Ajax," "Polar," "Pawnee," "Reliable."
(See page 121.)

AMERICAN Brass Novelty Co., Grand Haven, Mich.

AMERICAN Injector Co., 178 14th Ave., Detroit, Mich.

AMERICAN Lubricator Co., Summit Ave. & Wabash Ry., Detroit, Mich.

AMERICAN Pin Co., Waterbury, Conn.

AMERICAN Stamping Co., Battle Creek, Mich.

ANSONIA Mfg. Co., Ansonia, Conn.

APEX—See Lonergan Co.

ARROW—See Long Bros.

BAILEY, Wm. J., 401 Mulberry St., Newark, N. J. "Climax."

BAY State Stamping Co., 380 Chandler St., Worcester, Mass.

BESLY & Co., Charles H., 118-24 N. Clinton St., Chicago, Ill. "Helmet."

BOWEN Mfg. Co., Auburn, N. Y. "Empress."
(See page 151.)

BUCKEYE Iron & Brass Works, 324 E. Third St., Dayton, O.

BUFFALO—See Sherwood Mfg. Co.

BURNS & Bassick Co., Bridgeport, Conn.
(See page 195.)

CAMDEN—See Lindholm Metal Stamping Co

CHICAGO—See Ohio Injector Co.

CLIMAX—See Bailey, Wm. J.

CLIMAX Metal Products Co., 256-57 Broadway, New York, N. Y.
(See page 551.)

COLONIAL—See Powell Co.

COLUMBIA—See Allen Mfg. Co.

CRANE Co., 836 S. Michigan Ave., Chicago, Ill.

CRUM-WILEY Mfg. Co., Peru, Ind. "Ideal," "Perfection."

CUTTER—See Long Bros.

CZAR—See Allen Mfg. Co.

DETROIT Lubricator Co., Detroit, Mich.
(See page 231.)

EDELMANN & Co., E. 225 W. Illinois St., Chicago, Ill.

Complete Index to Classification appears on Pages 8 to 26.

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When you want crankshafts delivered on time

you should go to the plant which ships hundreds of high-grade crankshafts daily to the largest and most discriminating manufacturers in the country.

We are called "The Crankshaft Specialists" because we do make good crankshafts and deliver them on time!

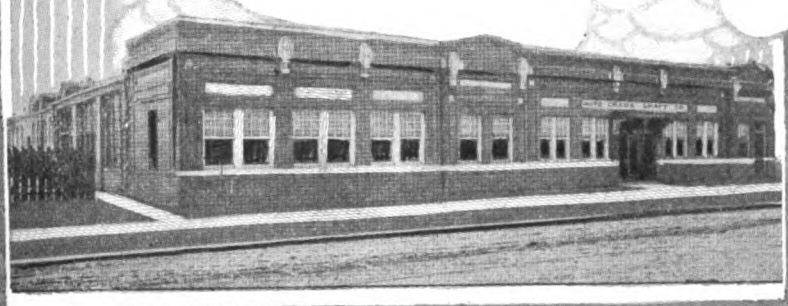
Quality, the result of seven years of special experience.

Prompt deliveries no matter how large the order.

Prices right.

Can you really do better than this?

Auto Crankshaft Company
DETROIT MICHIGAN



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CUPS (Continued)

OIL AND GREASE CUPS (Continued)

EMPRESS—See Bowen Mfg. Co.

ESSEX Brass Co., G. B., 480-86 Franklin St., Detroit, Mich.

GENERAL Pressed Metal Co., American & Diamond Sts., Philadelphia, Pa.

GIBBS—See Allen Mfg. Co.

GITS Bros. Mfg. Co., 557 Quincy St., Chicago, Ill.

GREER, Frederic, 525 W. Van Buren St., Chicago, Ill.

GUARDIAN—See Sherman Mfg. Co.

HANS Motor Equipment Co., La Crosse, Wis.

HAWTHORNE Mfg. Co., 38 Spruce St., Bridgeport, Conn.

HELMET—See Besly & Co.

HENRY Mfg. & Grease Cup Co., Terre Haute, Ind.

IDEAL—See Crum-Wiley Mfg. Co.

IDEAL—See Lunkenheimer Co.

IMPERIAL Brass Mfg. Co, 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

KELLY & Jones Co., Greensburg, Pa.

LINDHOLM Metal Stamping Co., 107-15 Erie St., Camden, N. J. "Vale," "Camden," "Madeira," "McKee," "Simplex," "Reno."
(See page 151.)

LION—See Lunkenheimer Co.

LONERGAN Co., J. E., 211-15 Race St., Philadelphia, Pa. "Apex."
(See page 507.)

LONG Bros., Broadway & Buckeye St., Kokomo, Ind. "Arrow," "Cutter."

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O. "Ideal," "Lion," "Pioneer," "Royal," "Sentinel," "Tiger."

M & E—See Merchant & Evans Co.

McKEE—See Lindholm Metal Stamping Co.

McRAE & Roberts Co., 221-35 Campbell Ave., Detroit, Mich.

MADEIRA—See Lindholm Metal Stamping Co.

MECCA—See Powell Co.

MECHANICAL & Electrical Mfg. Co., 2225 Prairie Ave., Chicago, Ill.

MERCHANT & Evans Co., Philadelphia, Pa. "M & E."

MICHIGAN Lubricator Co., 661-73 Beaubein St., Detroit, Mich.

MILWAUKEE Valve Co., 139 Burrell St., Milwaukee, Wis.

MOGUL—See Powell Co.

NATIONAL Brass Mfg. Co., 191-93 Mill St., Rochester, N. Y.

NIAGARA—See Sherwood Mfg. Co.

OHIO Injector Co., Wadsworth, O. "Chicago."

PAWNEE—See Allen Mfg. Co.

PEERLESS—See Allen Mfg. Co.

PENBERTHY Injector Co., Detroit, Mich. "Sterling."

PERFECT—See Sherman Mfg. Co.

PERFECTION—See Crum-Wiley Mfg. Co.

PIONEER—See Lunkenheimer Co.

POLAR—See Allen Mfg. Co.

POWELL Co., Wm., 2521-31 Spring Grove Ave., Cincinnati, O. "Mogul," "Progress," "Renown," "Vanguard," "Colonial," "Mecca,"

PREMIUM—See Sherman Mfg. Co.

PROGRESS—See Powell Co.

QUEEN City Brass & Iron Works, Spring Grove Ave., Cincinnati, O.

RELIABLE—See Allen Mfg. Co.

RENO—See Lindholm Metal Stamping Co.

RENOWN—See Powell Co.

RICH Mfg. Co., 370 Atlantic Ave., Boston, Mass.

ROYAL—See Lunkenheimer Co.

SENTINEL—See Lunkenheimer Co.

SHERMAN Mfg. Co., H. B., 12 Barney St., Battle Creek, Mich. "Premium," "Perfect," "Guardian," "Active."

SHERWOOD Mfg. Co., 1702-16 Elmwood Ave., Buffalo, N. Y. "Niagara," "Buffalo."

SIMPLEX—See Agner Co.

SIMPLEX—See Lindholm Metal Stamping Co.

STAR Brass Mfg. Co., 108-14 E. Dedham St., Boston, Mass.

STAR Brass Works, 1721-23 Baltimore Ave., Kansas City, Mo.

STERLING—See Penberthy Injector Co.

SWIFT Lubricator Co., Elmira, N. Y.

TIGER—See Lunkenheimer Co.

TUCKER, W. H. & C. F., Hartford, Conn.
(See page 143.)

VALE—See Lindholm Metal Stamping Co.

VANGUARD—See Powell Co.

WILKINSON Co., Wm. H., West Medway, Mass.

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

WINKLEY Co., Detroit, Mich.
(See page 149.)

ZERK Mfg. Co., Cleveland, O.

SPRING KEY PRIMING CUPS

(For ordinary priming cups—See Cocks, Standard Pet)

AMERICAN Brass & Iron Co., Detroit, Mich.
(See page 211.)

AMERICAN Injector Co., 173 14th Ave., Detroit, Mich.

CRUM-WILEY Mfg. Co., Peru, Ind.

DETROIT Brass Works, 1304 Brooklyn Ave., Detroit, Mich.

EDELMANN & Co., E., 225 W. Illinois St., Chicago, Ill.

HANCOCK Mfg. Co., 770 Henry St., Charlotte, Mich.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O.

McRAE & Roberts Co., 211-35 Campbell Ave., Detroit, Mich.

Complete Index to Classification appears on Pages 8 to 26.

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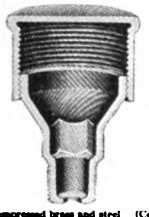
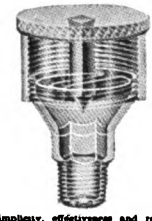
GREASE CUPS WINKLEY SPRING BOLTS



Plain, compressed brass and steel (Combination means brass cups and steel base.) Patented process makes these Cups wonderfully uniform and practical.

DESCRIPTIVE LIST

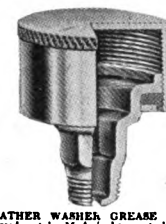
No.	Inside Dia. Cap	Rec. Pipe Thread	Optional Pipe Thread	Optional Female Pipe Thread	In Oz. Capacity
000	¼	⅛	1/32		⅛
00	1	⅛	⅛	⅛	⅛
0	1⅛	⅛	⅛	⅛	1
1	1⅛	⅛	⅛	⅛	1½
2	2	⅛	⅛	⅛	3
3	2½	⅛	1/16	⅛	5
4	3	⅛	⅛	⅛	7



For simplicity, effectiveness and reliability, there is nothing like the RATCHET GREASE CUP. The cap absolutely cannot jar off. Has the appearance of a regular pressed metal cup with locking device entirely inside. Made of brass, steel, or combination. Sizes and description same as the next column.

HINGE TOP OILER

Has greater capacity than cast cups. Furnished in three sizes, namely, ¾", 1", 1¼". Plain Polished or Nickel Plated finish with ¼" or ⅜" pipe threads. Construction of Cap enables you to turn same to open in any direction required. Complete line of elbows tapped to size for above cups.



LEATHER WASHER GREASE CUP of pressed metal. Made in brass, steel or combination. LEATHER WASHER prevents grease from working through the threads and gives a tension which keeps the cap from jarring off. Note that LEATHER WASHER is crimped in by our own patented process so that it cannot possibly loosen. Same sizes as plain compressed grease cups given in second column.

"STERLING" SHACKLE BOLTS

Bolts are made of open hearth, cold rolled steel hardened in boiling oil by scientific process. "Hex" or round heads fitted with "STERLING" (as shown in cut) or Acorn heads. Assemblies are of brass furnished in any finish. Plunger type force feed. Very efficient and neat in appearance.

"DUSTPROOF" GREASE CUP

This is a self-locking Cap on which the Cap is locked by a cylindrical dustproof shell. Also made as assembly on shackle bolts. This Cup can be furnished with standard Cap if so desired.

"STERLING" GREASE CUP

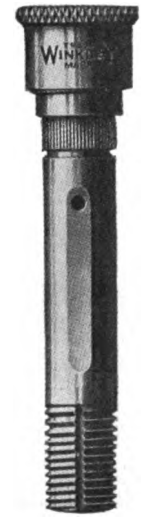
(Patented)

This is a force feed leather-packed plunger cup with a locking device in the base. Cannot rattle loose. Handle never projects more than shown in the cut. Also made on Shackle Bolts as shown on this page with or without "hex" head. This is an excellent and standard device.

"ACORN" GREASE CUP

(Patented)

This Cup is constructed the same as the "Sterling" with the exception of the handle, which gives it a very neat appearance. It is becoming very popular with the trade being adaptable for use on shackle bolts.



"WINKLEY" RATCHET BOLTS

Manufactured from same grade of material as Bolt on opposite side of page. Equipped with less expensive assembly. Plain cap made from brass or steel in any finish required. Square post in cap which engages spring in head of bolt. Most effective and reliable Ratchet of simple construction on the market. Very economically furnished in large quantities.

"M" OIL HOLE COVER

Opens in any direction by using spout of oil can to tip cover. Closes automatically.

STANDARD PRICE LIST AND SIZES

No.	Stock Diam.	Thread Pitch	Optional Pipe Thread	Diam. of Cap	Rec. of Hex.	Price per 100
1	¼	32		⅜	⅜	$7 00
2	5/16	32	⅛-32	½	5/16	9 50
3	⅜	24	⅛	⅝	⅜	10 70
4	⅜	24	⅛	⅝	⅜	12 50
5	⅜	24	⅛	⅝	⅜	16 00
6	½	24	¼ or ⅛	¾	½	22 00
7	½	Pipe	⅛	1	½	30 00
8	½	Pipe	⅛ or ¼	1	1/16	36 00

We keep all sizes of taps in stock for elbows. We always send nickel plated finish and stock threads unless specified otherwise.

Write for samples and prices, stating quantity desired.

Give style and number in ordering.

"N" OIL HOLE COVER

Sets very low. Opened in any direction with oil can spout. Closed automatically.

STANDARD PRICE LIST AND SIZES

No.	Stock Diam.	Thread Pitch	Diam. of Hex.	Diam. of Cap	List per 100 Nickeled
1	¼	32	¼	5/16	$7 00
2	5/16	32	5/16	⅜	9 50
3	⅜	24	⅜	½	10 70
4	⅜	24	⅜	½	12 50
5	½	24	½	⅝	16 00

"D" OIL HOLE COVER

Self-closing, dust-proof. Coil spring of piano wire. Always closes it.

STANDARD PRICE LIST AND SIZES

No.	Stock Diam.	Thread Pitch	Optional Pipe Thread	Diameter of Cap	List per 100
0	10	32		11/16	$7 00
1	¼	32		¾	7 00
2	5/16	32		⅞	9 50
3	⅜	24	⅛	⅞	10 70
4	⅜	24	⅛	⅞	12 50
5	½	24	¼	1⅛	16 00

"A" HOLE OIL COVER

Made with shoulder at top to drive in when assembled. Self-closing, dust-proof. Requires the use of only one hand of operator.

STANDARD PRICE LIST AND SIZES

No.	Diameter	Length	Drive Into	List per 100
0-A	¼	⅝	¼	$4 00
1-A	5/16	⅝	5/16	5 00
2-A	⅜	⅝	⅜	6 25
3-A	⅜	⅝	⅜	7 50
4-A	½	⅝	½	8 75
5-A	½	⅝	½	10 00
6-A	½	⅝	½	12 00

Nickel Plated Oilers always sent.

"K" OIL HOLE COVER

Has a Hex shoulder which provides means of screwing into bearing. Self-closing, dust-proof. Extends slightly.

LIST OF STANDARD SIZES AND PRICES

No.	Diameter Hex	Thread	List per 100
20-K	¼	.201-32	$4 00
21-K	5/16	1/16-32	4 70
22-K	⅜	3/32-24	5 20
23-K	½	⅛ Pipe	6 00
24-K	½	¼ Pipe	7 50
25-K	½	⅛ Pipe	10 50

"C" OIL HOLE COVER

Not self-closing, but easily closed by hand. Screw-driver slot. Cannot come apart.

STANDARD PRICE LIST AND SIZES

No.	Thread	Optional Pipe Thread	Diameter of Cap	List per 100
0	.10-32		11/16	$7 00
1	1/4-32		¾	7 00
2	5/16-32		⅞	9 50
3	3/8-24	⅛	⅞	10 70
4	1/2-24	¼	1⅛	12 50
5	5/8-24	⅛	1⅜	16 00

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CUPS (Continued)

SPRING KEY PRIMING CUPS (Continued)

NATIONAL Brass Mfg. Co., 191-93 Mill St., Rochester, N. Y.

POWELL Co., Wm., 2521-31 Spring Grove Ave., Cincinnati, O.

STANDARD Brass Works, 528-30 Woodbridge St., E., Detroit, Mich.

SPRING LEAF OILING CUPS

BROWN, W. H., Rose Bldg., Cleveland, O.

GRUS, Jr. & Co., Wm., 5313 Wayne Ave., Chicago, Ill.

REA & Co., W. B., 136 Liberty St., New York, N. Y.

FULTON Foundry & Machine Co., 25 Furman St., Brooklyn, N. Y.

MANUFACTURERS Foundry Co., Waterbury, Conn.
(See page 407.)

MICHIGAN Crank Shaft Co., Lansing, Mich.
(See page 151.)

MUNCIE Foundry & Machine Co., Muncie, Ind.
(See page 531.)

NEW Standard Foundry Co., Detroit, Mich.
(See page 105.)

SPACKE Machine Co., F. W., Indianapolis, Ind.
(See page 253.)

WAINWRIGHT & Son, W. W., Connersville, Ind.
(See page 309.)

CURTAINS

SPECIAL TOP CURTAINS

COLLINS—See Novelty Leather Works.

DETROIT Flash Curtain Co., Free Press Bldg., Detroit, Mich.

JIFFY Auto Curtain Co., Dodge Power Bldg., Detroit, Mich.

NOVELTY Leather Works, Jackson, Mich. "Collins."

SCOTT—See Star Storm Front Co.

STANDARD Division Curtain Co., 1338 Race St., Philadelphia, Pa.

STAR Storm Front Co., Canal St., Troy, O. "Scott."

CUSHIONS

SPECIAL SEAT CUSHIONS

(For ordinary cushions—See Bodies; also Tops)

PNEUMATIC Mfg. Co., 526 17th St., Brooklyn, N. Y.

CUT-OUTS

THERMOSTATIC CUT-OUTS

(For automatically cutting out charging current if battery becomes overheated)

STAWIL Co., Quincy, Ill.

CYLINDERS

FINISHED OR MACHINED CYLINDERS

(For cylinder castings in the rough—See Casting, Gray Iron)

FERRO Machine & Foundry Co., 47 Hubbard Ave., Cleveland, O.

DASHES

LEATHER DASHES

McKINNON Dash Co., 252 Amherst St., Buffalo, N. Y.

PETERS & Herron Dash Co., Gift & Culbertson Sts., Columbus, O.

METAL DASHES

A-Z Co., 530 W. 56th St., New York, N. Y.

BRISCOE Mfg. Co., Woodward & Baltimore Aves., Detroit, Mich.
(See page 331.)

BRISCOE Mfg. Co., Detroit, Mich.

HAYES Mfg. Co., Detroit, Mich.

KINSEY Mfg. Co., Toledo, O.

MULLINS Co., W. H., 182 Franklin St., Salem, O.

WOOD DASHES

AMERICAN Veneer Co., 1501 Clinton St., Hoboken, N. J.

DANN Bros. & Co., 80-88 Franklin St., New Haven, Conn.

DETROIT Auto Dash Co., 519-21 Beaubien St., Detroit, Mich.
(See page 479.)

EGGERS Veneer Seating Co., F., Two Rivers, Wis.

HANSON-WARD Veneer Co., Bay City, Mich.

HARTFORD Pattern & Model Co., 120 Allyn St., Hartford, Conn.

INDIANA Veneer & Panel Co., New Albany, Ind.

LOUISVILLE Veneer Mills, 1122-40 Fulton St., Louisville, Ky.

NEW JERSEY Veneer Co., 258 W. Railway Ave., Paterson, N. J.

STANDARD Cabinet Mfg. Co., Peru, Ind.

WIDMAN & Co., J. C., 14th, 15th Sts. & G. T. Ry., Detroit, Mich.

WISCONSIN Seating Co., New London, Wis.

Complete Index to Classification appears on Pages 8 to 26.

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SIMPLEX

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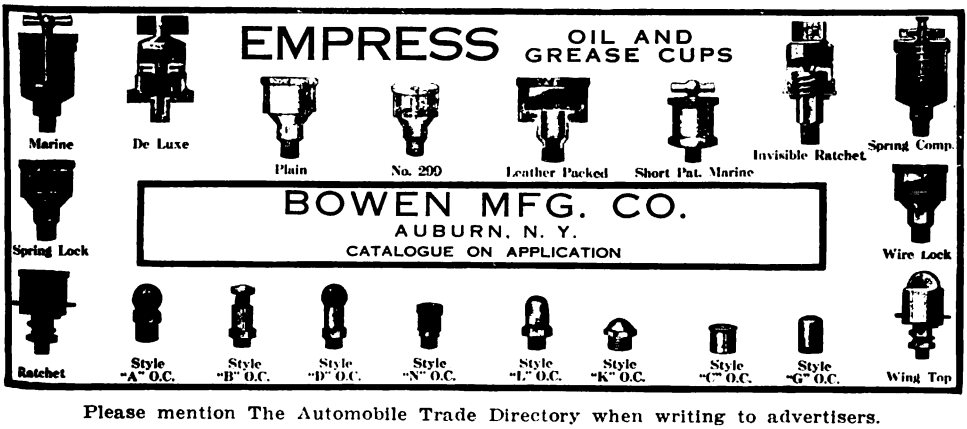

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DIMMERS

HEADLIGHT DIMMERS OR SHADES

AJAX—See Wanner Mfg. Co.

AMERICAN Mantel Co., Anderson, Ind.

BRETT Dimmer Co., A. M., Mason City, Ia.

CHANEY Co., L. F., Springfield, O.

CHICAGO Dimmer Co., 175 W. Jackson Blvd., Chicago, Ill.

COLUMBUS Ignition Lighter Co., Wyandotte Bldg., Columbus, O.

CONNECTICUT Electric Mfg. Co., Connecticut & Florence Aves., Bridgeport, Conn.

CORNING Glass Works, Corning, N. Y.

DAZZLENOTS—See Servus Selling Co.

DIM-A-LITE—See Pellets Magneto Exchange.

DIMIT—See Suburban Lighting & Gas Engine Co.

DISTRIBUTORS & Manufacturers Co., 82 W. Washington St., Chicago, Ill. "Monarch."

DUDLEY Bros., 203 E. 23d St., Chicago, Ill.

ECLIPSE Mfg. Co., Box R. B., Auburn, N. Y. "Safety First."
(See page 153.)

ECLIPSE—See Vesta Accumulator Co.

ESSENKAY Products Co., 543 Orleans St., Chicago, Ill.

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill. "Monarch."

H-M—See Mulchahey, Howard F.

H. P. B. Electric Co., 500 Fifth Ave., New York, N. Y.

HICK-MYER Deflector Co., Toledo, O.

JACKSON Co., Chas. D. (Motor Mart), Boston, Mass.

JONES Auto Supply Co., 25th St. & Broadway, Oakland, Cal.

LEONARD Electric Co., Ward, Bronxville, N. Y. "Nodaz."

MIDDLETON, J. G., Pittsfield, Mass.

MONARCH—See Distributors & Manufacturers Co.

MONARCH—See Fowler Lamp & Mfg. Co.

MULCHAHEY, Howard F., 8 Mt. Vernon St., Providence, R. I. "H-M."

NODAZ—See Leonard Electric Co.

OSGOOD Autolite Deflector Co., First National Bank Bldg., Chicago, Ill.

PELLETS Magneto Exchange, 1606 Michigan Ave., Chicago, Ill. "Dim-a-Lite."

SAFETY FIRST—See Eclipse Mfg. Co.

SELLING & Mfg. Co., Union Bldg., Cleveland, O. "Semilites."

SEMILITES—See Selling & Mfg. Co.

SERVUS Selling Co., 10 Johnson St., Newark, N. J. "Dazzlenots."

SUBURBAN Lighting & Gas Engine Co., Summit & Lagrange Sts., Toledo, O. "Dimit."

TOBEY, Wm. L., 9 Lewis St. (E. Boston), Boston, Mass.

VESTA Accumulator Co., 2100 Indiana Ave., Chicago, Ill. "Eclipse."

WANNER Mfg. Co., Chicago, Ill. "Ajax."

DISCS

RADIATOR DISCS OR FINS

ACKLIN Stamping Co., Toledo, O.

BRISCOE Mfg. Co., Woodward & Baltimore Aves., Detroit, Mich.
(See page 331.)

WORCESTER Pressed Steel Co., Worcester, Mass.
(See page 157.)

STEEL CLUTCH DISCS

ACKLIN Stamping Co., Toledo, O.

BOSSERT Co., Utica, N. Y.
(See page 223.)

BUFFALO Pressed Steel Co., Military Rd. & Lansing St., Buffalo, N. Y.

DISSTON & Sons, Henry (Tacony), Philadelphia, Pa.

KONIGSLOW Mfg. Co., Otto, E. 35th St. & Perkins Ave., Cleveland, O.

MOLTRUP Steel Products Co., Beaver Falls, Pa.

OLDHAM & Sons, Joshua, 114-18 Liberty St., New York, N. Y.

SIMONDS Mfg. Co., North St., Fitchburg, Mass.

UNIQUE Findings & Supply Co., 36 Garnet St., Providence, R. I.

DISTRIBUTERS

SPARK DISTRIBUTERS

(See Timers, Ignition)

DRESSING

CLUTCH AND BELT DRESSING

ARMIGER Chemical Co., 2155-57 Austin Ave., Chicago, Ill. "Rex."

BORNSCHEIN & Co., John F., 6304 Wallace St., Chicago, Ill. "Sampson."

CLEVELAND Auto-Clutch Dressing Co., Cleveland, O. "Slipnot."

DURKEE-ATWOOD Co., Minneapolis, Minn. "Rie-Nie."
(See page 131.)

ENSIGN Refining Co., 10605 Quebec Ave., Cleveland, O.

GRAY Specialty Co., 148 Avon Ave., Newark, N. J. "Velvet."

GRIP-TITE Co., George & Church Sts., New Brunswick, N. J.

HOLLINGSHEAD Co., R. M., Camden, N. J. "Whiz."

NORTHWESTERN Chemical Co., Marietta, O.
(See page 131.)

OWL—See Western Chemical Mfg. Co.

REX—See Armiger Chemical Co.

RIE-NIE—See Durkee-Atwood Co.

SAMPSON—See Bornschein & Co.

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guaranteed to remove blinding glare from Auto headlights, but still retain a powerful driving light. Complies with city ordinances and makes country driving a pleasure, and insures safety. Installed on any car equipped with gas or electricity. Operated by automatic foot device.

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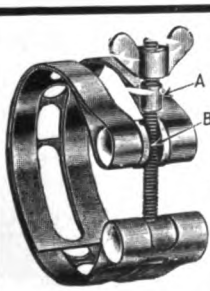

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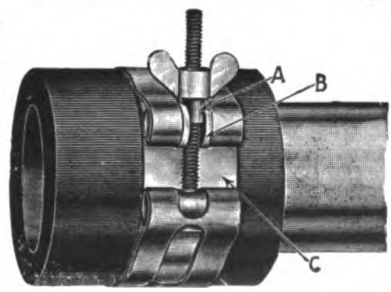

WRITE FOR FOLDER

A. CATELAIN, 1446-48 Indiana Ave., Chicago

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DRESSING (Continued)

CLUTCH AND BELT DRESSING (Continued)

SLIPNOT—See Cleveland Auto-Clutch Dressing Co.

UNO Mfg. Co., 6415-33 E. Ravenswood Pk., Chicago, Ill.

VELVET—See Gray Specialty Co.

WESTERN Chemical Mfg. Co., 151 Sixth St., Milwaukee, Wis. "Owl."

WHIZ—See Hollingshead Co.

LEATHER DRESSING

ALCOVIE—See Matt & Co.

ALDER Chemical Co., Mt. Vernon, N. Y. "Star."

AMERICAN Lacquer Co., Bruce Ave., Bridgeport, Conn.

American Para Rubber Co., 6727 S. Broadway, St. Louis, Mo. "Paruco."

ARMIGER Chemical Co., 2155-57 Austin Ave., Chicago, Ill. "Rex."

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Slikup."
(See page 133.)

ARNSTEIN, Eugene, 46th St. & Wentworth Ave., Chicago, Ill. "Century."

ARSENAL Varnish Co., Rock Island, Ill

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Renew-O."
(See page 131.)

B-BRITE—See Polish Products Co.

BANNER—See Wadsworth-Howland Co.

BAUM'S Castorine Co., 104 N. George St., Rome, N. Y.

BAY STATE—See Wadsworth, Howland & Co.

BILCHACO—See Billings-Chapin Co.

BILLINGS-CHAPIN Co., Cleveland, O. "Bilchaco."

BRITISH-AMERICAN Mfg. Co., 811 Woodward Ave., Detroit, Mich. "Waterize."

CENTURY—See Arnstein, Eugene.

CHICAGO White Lead & Oil Co., 1454 S. Western Ave., Chicago, Ill. "King."

COL-R-OLE—See Rub-On Mfg. Co.

COLUMBUS Varnish Co., Columbus, O. "Peerless."
(See page 155.)

CUMMER Products Co., 2150 W. 15th St., Cleveland, O. "Perfect Auto Gloss."

DETROIT White Lead Works, 530-60 Milwaukee Ave., E., Detroit, Mich. "Rogers."

DIX Mfg. Co., Lewistown, Pa.

DURKEE-ATWOOD Co., Minneapolis, Minn. "Rie-Nie."
(See page 131.)

EBERSON Paint Co., 18th & Pine Sts., St Louis, Mo. "Leather-Lac."

EVERNEW—See Felton, Sibley & Co.

FELTON, Sibley & Co., 136-40 N. Fourth St., Philadelphia, Pa. "Evernew."

FLEXO—See Rodriguez, R. E.

GENERAL Specialties Co., 100 Boylston St., Boston, Mass. "Imperial."

GLAZENE Co., 1330 W. Jackson Blvd., Chicago, Ill.

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

HAUTHAWAY & Sons, C. L., 346 Congress St., Boston, Mass.

HOLLINGSHEAD Co., R. M., Camden, N. J. "Whiz."

HORSEY Mfg. Co., 6104 Euclid Ave., Cleveland, O.

IMPERIAL—See General Specialties Co.

JEWELL Mfg. Co., 21st St. & Marshall Blvd., Chicago, Ill. "Nelsons."

JOHNSTON Paint Co., R. F., Cincinnati, O. "Leather Lac," "Top Fix."
(See page 155.)

KING—See Chicago White Lead & Oil Co.

LAWRENCE & Co., W. W., Pittsburg, Pa.

LEAKANOT—See National Rubber Co.

LEATH-R-NU—See Nu-Back Mfg. Co.

LEATHER-LAC—See Eberson Paint Co.

LEATHER LAC—See Johnston Paint Co.

LUCAS & Co., John, 322-30 Race St., Philadelphia, Pa.

McDOUGALL Varnish Co., Buffalo, N. Y.

MARTIN, L. G., 3923 Forbes St., Pittsburg, Pa.

MATT & Co., F., 491 Washington St., Newark, N. J. "Alcovie."

MECHEM, J. L., 118 E. Jackson St., Centerville, Ia.

MILLER Co., Frank, 349-51 W. 26th St., New York, N. Y.

MONTGOMERY-WASHBURN Co., Saugerties, N. Y.

MOUND City Paint & Color Co., 11th & Mullanphy Sts., St. Louis, Mo.

NATIONAL Rubber Co., 4409 Piqua St., St. Louis, Mo. "Leakanot."

NATIONAL Sales Co., 2431 Vine St., Kansas City, Mo. "3-W."

NELSONS—See Jewell Mfg. Co.

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill.

NORTHWESTERN Chemical Co., Marietta, O. "Norwesco."
(See page 131.)

NORWESCO—See Northwestern Chemical Co.

NOUVEAU—See Rodriguez, R. E.

NU-BACK Mfg. Co., 114 N. Commercial St., St. Louis, Mo. "Leath-R-Nu."

NUBIAN Paint & Varnish Co., 1856 Le Claire Ave., Chicago, Ill. "Victory."

ORIENTAL Enamel Co., 963 W. Sixth St., Long Beach, Cal.

PARUCO—See American Para Rubber Co.

PEERLESS—See Columbus Varnish Co.

PERCAMA—See Perkins Campbell Co.

PERFECT AUTO GLOSS—See Cummer Products Co.

PERKINS Campbell Co., 634 Broadway, Cincinnati, O. "Percama."
(See page 48.)

PIONEER—See Northwestern Chemical Co.

POLISH Products Co., 815-17 E. 21st St., Kansas City, Mo. "B-Brite."

RENEW-O—See Atlas Auto Supply Co.

REX—See Armiger Chemical Co.

RIE-NIE—See Durkee-Atwood Co.

RODRIGUEZ, R. E., 56-58 Warren St., New York, N. Y. "Nouveau," "Flexo."

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Peerless Mohair Top Dressing—For waterproofing and renewing old tops.
Peerless Leather Top Dressing—For softening and renewing rubber, leather and pantasote tops.
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Peerless Cushion Dressing—For brightening and renewing the finish on leather cushions.
Peerless Lamp Enamel Gloss—For making a rich gloss finish, with one coat covering solid.
Peerless Lamp Enamel Dull—For making a rich dull finish, with one coat covering solid.
Peerless Mirroroid—For a new varnish finish on dull automobile paint. Apply with a cloth. Dry in five hours.
Peerless Cylinder Enamel—Black or Gray colors as desired. Wears indefinitely.
Peerless Jet Black Fender Japan—For finishing fenders with a rich, high gloss enamel effect.
Peerless Auto Body Polish—Polish that we recommend for varnished surfaces.
Peerless Rim Paint—One coat keeps tires from sticking and rims from rusting.
Peerless Extra Fine Black Japan—A solid covering gloss enamel for all around work.

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THE IDEAL SURFACER

A filler or surfacer for use on wood, metal or canvas, making an elastic, impervious coating that will hold out the finish. For painting automobiles, carriages, wagons, street cars, etc.

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CATALOGUES SENT ON APPLICATION

American Gas Furnace Company
Gas Engineers and Manufacturers
24 John Street See Classified Index **New York**

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DRESSING (Continued)

LEATHER DRESSING (Continued)

ROGERS—See Detroit White Lead Works.

RUB-ON Mfg. Co., 89 Brayton St., Buffalo, N. Y. "Rub-R-Tite." "Col-R-Ole."

RUB-R-TITE—See Rub-On Mfg. Co.

ST. LOUIS Rubber Cement Co., 3046 Lambdin Ave., St. Louis, Mo.

SCHLEGEL Mfg. Co., Oscar, 111 E. 12th St., New York, N. Y.

SCHMOEGER, Frederic A., Sterling, Ill. "Sterling."

SLIKUP—See Arnold, N. B.

STAR—See Alder Chemical Co.

STERLING—See Schmoeger, Frederic A.

3-W—See National Sales Co.

THUMB, E. W., 872 Orleans St., Chicago, Ill.

TOP FIX—See Johnston Paint Co.

UNO Mfg. Co., 6415-33 E. Ravenswood Pk., Chicago, Ill.

VAN Cleef Bros., 7709-11 Woodlawn Ave., Chicago, Ill.

VAN TILBURG Oil Co., 2424-28 University Ave., S. E., Minneapolis, Minn. "Wang."

VICTORY—See Nubian Paint & Varnish Co.

WADSWORTH-HOWLAND Co., 225 Carpenter St., Chicago, Ill. "Banner."

WADSWORTH, Howland & Co., 84 Washington St., Boston, Mass. "Bay State."

WANG—See Van Tilburg Oil Co.

WATERIZE—See British-American Mfg. Co.

WEST Mfg. Co., 120-22 N. Madison St., Rockford, Ill.

WHIZ—See Hollingshead Co.

WONDER WORKER—See Hall-Thompson Co.

ZINSSER & Co., W., 195 William St., New York, N. Y.

MOHAIR TOP DRESSING

AMERICAN Chemical & Mfg. Co., Arcade Bldg., Norfolk, Va. "Coleman's," "Hippo."

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Slikup."
(See page 133.)

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "X-Ray."
(See page 131.)

CARR CO., F. S., Boston, Mass. "Success."
(See page 123.)

COLEMAN'S—See American Chemical & Mfg. Co.

COLUMBUS Varnish Co., Columbus, O. "Peerless."
(See page 155.)

DURKEE-ATWOOD Co., Minneapolis, Minn. "Rie-Nie."
(See page 131.)

EVERNEW—See Felton, Sibley & Co.

FELTON, Sibley & Co., 136-40 N. Fourth St., Philadelphia, Pa. "Evernew."

GLAZENE Co., 1330 W. Jackson Blvd., Chicago, Ill.

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

HIPPO—See American Chemical & Mfg. Co.

LEATH-R-NU—See Nu-Back Mfg. Co.

MILLER Co., Frank, 349-51 W. 26th St., New York, N. Y.

NATIONAL Sales Co., 2431 Vine St., Kansas City, Mo. "3-W."

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill.

NU-BACK Mfg. Co., 114 N. Commercial St., St. Louis, Mo. "Leath-R-Nu."

PEERLESS—See Columbus Varnish Co.

PERCAMA—See Perkins Campbell Co.

PERKINS Campbell Co., 634 Broadway, Cincinnati, O. "Percama."
(See page 48.)

PRICE Fire & Water Proofing Co., Poughkeepsie, N. Y.

RIE-NIE—See Durkee-Atwood Co.

SLIKUP—See Arnold, N. B.

SUCCESS—See Carr Co.

VAN TILBURG Oil Co., 2424-28 University Ave., S. E., Minneapolis, Minn. "Wang."

WANG—See Van Tilburg Oil Co.

WONDER Worker—See Hall-Thompson Co.

X-RAY—See Atlas Auto Supply Co.

DRUMS

PRESSED STEEL BRAKE DRUMS

(For Cast Drums—See Castings)

AVERY Stamping Co., 5209 Lakeside Ave., Cleveland, O.

BOSSERT Co., Utica, N. Y.
(See page 223.)

CROSBY Co., Buffalo, N. Y.
(See page 157.)

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

FEDERAL Pressed Steel Co., Milwaukee, Wis.
(See page 157.)

GIER & Dail Mfg. Co., Lansing, Mich.

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O.
(See page 81.)

HYDRAULIC Pressed Steel Co, 3164 E. 61st St., Cleveland, O.
(See page 289.)

IRELAND & Matthews Mfg. Co., 51-79 Iron St., Detroit, Mich.

KELSEY Wheel Co., Detroit, Mich.

KINSEY Mfg. Co., Toledo, O.

KONIGSLOW Mfg. Co., Otto, E. 35th St. & Perkins Ave., Cleveland, O.

PRESSED Steel Tank Co., West Allis, Wis.

WORCESTER Pressed Steel Co., Worcester, Mass.
(See page 157.)

DUSTERS

MOTORISTS DUSTERS

(See Clothing, Motorists)

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Main Office and Factory

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DYE

TOP LINING DYE

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Slikup."
(See page 133.)

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Nu-Stain."
(See page 131.)

COLUMBUS Varnish Co., Columbus, O.
(See page 155.)

HOLLINGSHEAD Co., R. M., Camden, N. J. "Whiz."

NORTHWESTERN Chemical Co., Marietta, O. "Norwesco."
(See page 131.)

NORWESCO—See Northwestern Chemical Co.

NU-STAIN—See Atlas Auto Supply Co.

RUB-ON Mfg. Co., 89 Brayton St., Buffalo, N. Y.

SLIKUP—See Arnold, N. B.

WHIZ—See Hollingshead Co.

DYNAMOMETERS

ELECTRIC TESTING DYNAMOMETERS

ALDEN, Geo. I., 48 Queen St., Worcester, Mass.

DIEHL Mfg. Co., Elizabethport, N. J.
(See page 227.)

SPRAGUE Electric Works, 527 W. 34th St., New York, N. Y.

HYDRAULIC TESTING DYNAMOMETERS

HERSCHELL-SPILLMAN Co., North Tonawanda, N. Y.
(See page 495.)

MICHIGAN Motor Specialties Co., 518-20 Woodbridge St. E., Detroit, Mich.
(See page 137.)

STANDARD Motor Construction Co., 172-80 Whiton St., Jersey City, N. J.

DYNAMOS

BATTERY CHARGING DYNAMOS AND MOTOR GENERATORS

ALLIS-CHALMERS Mfg. Co., Milwaukee, Wis.

CUSHMAN Electric Co., Concord, N. H.

DIEHL Mfg. Co., Elizabethport, N. J.
(See page 227.)

ECK Dynamo & Motor Co., Belleville, N. J.

FAIRBANKS Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

HOLTZER-CABOT Electric Co., Brookline, Mass.

KENDRICK & Davis Co., Lebanon, N. H.

LINCOLN Electric Co., 38th St. & Kelley Ave., N. E., Cleveland, O.

PEERLESS Electric Co., Warren, O.

ROBBINS & Myers Co., Lagonda Ave., Springfield, O.

ROTH Bros. & Co., Adams & Loomis Sts., Chicago, Ill.

SPRAGUE Electric Works, 527 W. 34th St., New York, N. Y.

WESTERN Electric Co., 463 West St., New York, N. Y.

WESTINGHOUSE Electric & Mfg. Co. (E. Pittsburg), Pittsburg, Pa.

ELECTRIC LIGHTING AND BATTERY CHARGING DYNAMOS

ADAMS-BAGNALL Electric Co., Cleveland, O.

ADAMS & Westlake Co., Chicago, Ill. "Adlake."
(See page 153.)

ADLAKE—See Adams & Westlake Co.

ALLIS-CHALMERS Mfg. Co., Milwaukee, Wis.

APELCO—See Apple Electric Co.

APPLE Electric Co., Newark, N. J. "Apelco."

AUTO-LITER—See Electric Auto-Lite Co.

AUTO-SPARKER—See Motsinger Device Mfg. Co.

AUTODYNE—See Bijur Motor Lighting Co.

BEST-LITE Mfg. Co., Newton, Ia.

BIJUR Motor Lighting Co., 15th St. & River Front, Hoboken, N. J. "Autodyne."

BOSCH Magneto Co., 223 W. 46th St., New York, N. Y.

BRIGGS Magneto Co., Elkhart, Ind. "Maglite."

CARLETON Co., 170 Summer St., Boston, Mass.

DA-LITE—See Dayton-Dick Co.

DAYTON-DICK Co., Quincy, Ill. "Da-Lite."

DAYTON Engineering Laboratories Co., Dayton, O. "Delco."

DEACO—See Detroit Electric Appliance Co.

DELCO—See Dayton Engineering Laboratories Co.

DETROIT Electric Appliance Co., 264-68 Jefferson Ave., Detroit, Mich. "Deaco."

DYNETO Electric Co., Syracuse, N. Y.
(See page 259.)

ECK Dynamo & Motor Co., Belleville, N. J.

ECONOMY Electric Co., Economy, Pa. "Perfection."

ELECTRIC Auto-Lite Co., Toledo, O. "Auto-Liter."
(See page 381.)

ELECTRICAL Engineering & Storage Battery Co., Hume-Mansure Bldg., Sandy Hook, Conn.

EMERSON Electric Mfg. Co., 2024-32 Washington Ave., St. Louis, Mo.

ESTERLINE Co., 228 E. South St., Indianapolis, Ind.

EUREKA—See Henricks Novelty Co.

Eveready Storage Battery Works of National Carbon Co., 514 W. 57th St., New York, N. Y.
(See page 233.)

FISHER Electrical Works, 2000 Larned St. W., Detroit, Mich.

Complete Index to Classification appears on Pages 8 to 26.

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ELECTRIC LIGHTING AND BATTERY CHARGING DYNAMOS (Continued)

FLANDERS Co., Woodward & Warren Aves., Detroit, Mich. "Uno."

GRAY & Davis, Boston, Mass.
(See page 159.)

HENRICKS Novelty Co., 1581 St. Paul St., Indianapolis, Ind. "Eureka."

HOLTZER-CABOT Electric Co., Brookline, Mass.

JACKSON Co., Chas. D. (Motor Mart), Boston, Mass.

KEMCO Electric Mfg. Co., 2229 Ashland Rd., Cleveland, O.

L-N—See Leece-Neville Co.

LEECE-NEVILLE Co., 2069 E. Fourth St., Cleveland, O. "L-N."

LEONARD Electric Co., Ward, Bronxville, N. Y.

MAGLITE—See Briggs Magneto Co.

MAXIMUM Electrical Co., 264-68 Jefferson Ave., E., Detroit, Mich.

MOTSINGER Device Mfg. Co., Lafayette, Ind. "Auto-Sparker."

NATIONAL Coil Co., Lansing, Mich.

NORTH East Electric Co., Rochester, N. Y.
(See page 531.)

OTHO Motor Co., 45 Milk St., Boston, Mass.

PERFECTION—See Economy Electric Co.

REMY Electric Co., Anderson, Ind.
(See page 427.)

SPLITDORF Electrical Co., Newark, N. J. "Splitdorflite."
(See page 161.)

SPLITDORFLITE—See Splitdorf Electrical Co.

TRECO—See Tritt Electric Co.

TRITT Electric Co., Union City, Ind. "Treco."

UNO—See Flanders Co.

VERLUX Co., Alliance, O.

VESTA Accumulator Co., 2100 Indiana Ave., Chicago, Ill.

WAGNER Electric Mfg. Co., 6400 Plymouth Ave., St. Louis, Mo.

WELLS Mfg. Co., R. C., Fond du Lac, Wis.

WESTINGHOUSE Electric & Mfg. Co., (E. Pittsburg), Pittsburg, Pa.

IGNITION DYNAMOS

(See Magnetos, Ignition)

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FUEL ECONOMIZERS

(See Mixers or Agitators, Fuel)

EJECTORS

STEAM EJECTORS

(For filling tanks on steam cars)

PENBERTHY Injector Co., Detroit, Mich

ELBOWS

PIPE ELBOWS

(See Fittings, Pipe)

ELECTROLYTE

STORAGE BATTERY ELECTROLYTE

CONTACT Process Co., Abbott Rd., Buffalo, N. Y.

GRASSELLI Chemical Co., 80 Maiden Lane, New York, N. Y.

KALBFLEISCH Co., Franklin H., Broadway & 16th St., New York, N. Y.
(See page 319.)

ENAMELS

AUTOMOBILE ENAMELS

(See Paints, Enamel)

BRASS ENAMELS, LACQUERS AND FINISHES

(For blackening lamps, radiators and other brass work on car—See also Paints, Enamel; also Lacquers, Metal)

ARGENAMEL Chemical Co., Smead & Bancroft Sts., Toledo, O.

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Slikup."
(See Page 133.)

ARSENAL Varnish Co., Rock Island, Ill.

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Metal-Lac," "Blac-Namel."
(See page 131.)

BLAC-NAMEL—See Atlas Auto Supply Co.

BRADLEY & Vrooman Co., Chicago, Ill. "C. Q. P."

BRASS-KOTE—See Northwestern Chemical Co.

C. Q. P.—See Bradley & Vrooman Co.

COLUMBUS Varnish Co., Columbus, O. "Peerless."
(See page 155.)

DURKEE-ATWOOD Co., Minneapolis, Minn. "Rie-Nie."
(See page 131.)

GUN Metal Finish Co., Main & Water Sts., Decatur, Ill.

HALL-THOMPSON Co., Hartford, Conn. "Jet-Lac."

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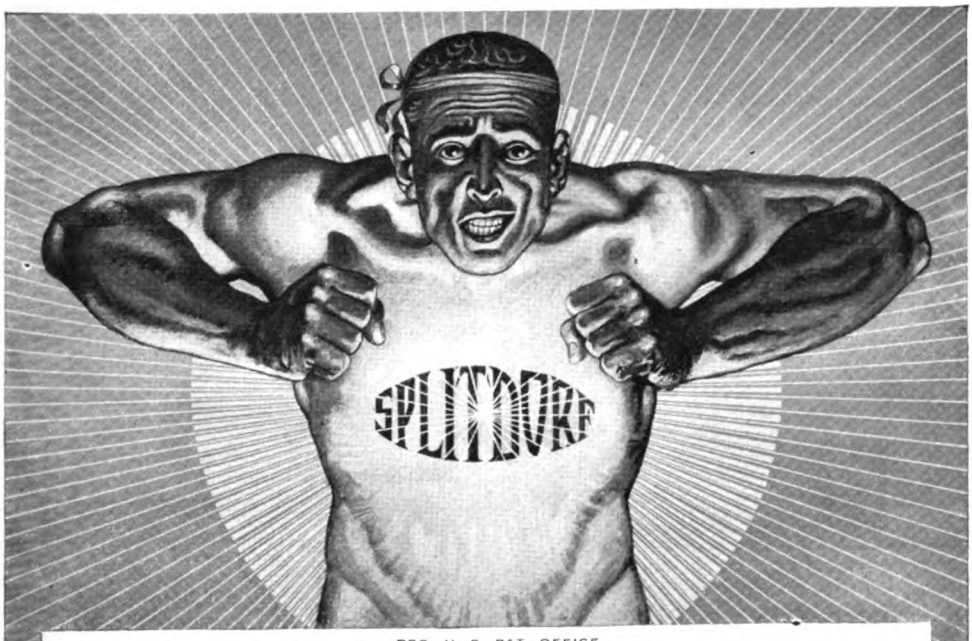

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DETROIT.....972 Woodward Ave.
KANSAS CITY.....1827 Grand Ave.
LOS ANGELES.....1215 S. Hope St.
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HOLLINGSHEAD Co., R. M., Camden, N. J. "Whiz."

JET-LAC—See Hall-Thompson Co.

LEATH-R-NU—See Nu-Back Mfg. Co.

METAL-LAC—See Atlas Auto Supply Co.

NATIONAL Cement & Rubber Co., 300-16 S. St. Clair St., Toledo, O.

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill.

NORTHWESTERN Chemical Co., Marietta, O. "Brass-Kote."
(See page 131.)

NU-BACK Mfg. Co., 114 N. Commercial St., St. Louis, Mo. "Leath-R-Nu."

PEERLESS—See Columbus Varnish Co.

RIE-NIE—See Durkee-Atwood Co.

RODRIGUEZ, R. E., 56-58 Warren St., New York, N. Y.

RUB-ON Mfg. Co., 89 Brayton St., Buffalo, N. Y.

SCHLEGEL Mfg. Co., Oscar, 111 E. 12th St., New York, N. Y.

SCHMOEGER, Frederic A., Sterling, Ill. "Stay-Shiny."

SLIKUP—See Arnold, N. B.

SONNEBORN Sons, L., Fulton & Pearl Sts., New York, N. Y. "3 Star."

STAY-BRIGHT Lacquer Co., 58 W. Washington St., Chicago, Ill.

STAY-SHINY—See Schmoeger, Frederic A.

3-STAR—See Sonneborn Sons.

WADSWORTH, Howland & Co., 84 Washington St., Boston, Mass.

WHIZ—See Hollingshead Co.

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GASOLINE ENGINES

(See Motors, Gasoline)

KEROSENE ENGINES

(See Motors, Kerosene)

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INST Lighter Co., 59 E. Main St., Columbus, O.

JOHNS-MANVILLE Co., H. W., Madison Ave. & 41st St., New York, N. Y.

LA MAY Mfg. Co., 80 N. Water St., Rochester, N. Y.

PHOENIX—See Rex-Harris Fire Appliance Co. of N. Y.

PYRENE Mfg. Co., 1358 Broadway, New York, N. Y.
(See page 163.)

RELIABLE—See Durkee & Co.

REX-HARRIS Fire Appliance Co. of N. Y., 36 E. 23d St., New York, N. Y. "Phoenix."

EYES

SCREW EYES

(See Screw Eyes)

FANS

RADIATOR FANS

(See also Radiators)

A-Z Co., 530 W. 56th St., New York, N. Y.

BRISCOE Mfg. Co., Woodward & Baltimore Aves., Detroit, Mich.
(See page 331.)

BUFFALO Pressed Steel Co., Military Rd. & Lansing St., Buffalo, N. Y.

HARDY Mfg. Co., Pendleton, Ind.
(See page 639.)

HOTZ Foundry & Mfg. Co., Fremont, O.

HUNT & Dorman Mfg. Co., 2102-10 Superior Ave., N. E., Cleveland, O.

KINSEY Mfg. Co., Toledo, O.

KONIGSLOW Mfg. Co., Otto, E. 35th St. & Perkins Ave., Cleveland, O.

McCORD Mfg. Co., Detroit, Mich.
(See pages 178 and 179.)

O-C—See Oakes Co.

OAKES Co., Indianapolis, Ind. "O-C."

SPARKS-WITHINGTON Co., Jackson, Mich.

TRIO Mfg. Co., 1192-1206 Bellevue Ave., Detroit, Mich.

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CURTAIN FASTENERS

ACME—See Scovill Mfg. Co.

ANDERSON Electric Machine Tool Co., 1113 Cass Ave., St. Louis, Mo.

BOSTON Fastener Co., 641-43 Atlantic Ave., Boston, Mass.

BREWSTER—See Cowles & Co.

CARR Fastener Co., 31 Ames St., Cambridge, Mass.

COWLES & Co., C., New Haven, Conn. "Brewster," "Excelsior," "Ideal," "Perfect," "Success."
(See page 87.)

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CURTAIN FASTENERS (Continued)

CRANDAL, Stone & Co., Binghamton, N. Y. "Pioneer," "Premier." (See page 369.)

DESOCO—See Detroit Socket Co.

DETROIT Auto Top Fastener Co., Beaubien & Fort Sts., Detroit, Mich. "Turtle."

DETROIT Socket Co., 814 Jefferson Ave., W., Detroit, Mich. "Desoco."

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

EXCELSIOR—See Cowles & Co.

HIGGIN Mfg. Co., Newport, Ky.

IDEAL—See Cowles & Co.

JONAH & George, Merrimac, Mass.

LEADER—See Neider Co.

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

MOTOR Parts Co., 818 N. Broad St., Philadelphia, Pa. "Wizard."

MURPHY Co., G. W. J., Merrimac, Mass.

NEIDER Co., F. A., Augusta, Ky. "Peerless," "Leader."

NOVELTY Mfg. Co., Waterbury, Conn.

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y. (See page 87.)

PEERLESS—See Neider Co.

PERFECT—See Cowles & Co.

PIONEER—See Crandal, Stone & Co.

PREMIER—See Crandal, Stone & Co.

ROEHM & Davison, Woodbridge & Wayne Sts., Detroit, Mich.

SCHERER & Co., H., Detroit, Mich.

SCOVILL Mfg. Co., 222 W. Lake St., Chicago, Ill. "Acme." (See page 349.)

SMITH & Co., Jos. N., Detroit, Mich. (See page 547.)

STRONG Co., M. H., 168 South Ave., Rochester, N. Y.

SUCCESS—See Cowles & Co.

TAYLOR Co., H. D., 101-05 Oak St., Buffalo, N. Y.

TURTLE—See Detroit Auto Top Fastener Co.

UNITED States Fastener Co., 95 Milk St., Boston, Mass. (See page 639.)

WILCOX, Crittenden & Co., 83 Main St., Middletown, Conn.

WIZARD—See Motor Parts Co.

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

HOOD FASTENERS

A-Z Co., 530 W. 56th St., New York, N. Y.

BURNS & Bassick Co., Bridgeport, Conn. (See page 195.)

BUSH Mfg. Co., Hartford, Conn. (See page 207.)

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

EVERTIGHT—See Garage Equipment Mfg. Co.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco," "Evertight." (See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

IMPERIAL Brass Mfg .Co., 1200 W. Harrison St., Chicago, Ill. (See page 83.)

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

KINSEY Mfg. Co., Toledo, O.

MEDINA Stamping & Machine Co., Medina, N. Y.

SARGEANT Mfg. Co., New & Summit Sts., Newark, N. J.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. (See page 293.)

WIENER-BARNET Co., 312-28 Adams St., Newark, N. J. (See page 249.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

FENDERS

AUTOMOBILE FENDERS

AUTOMOBILE Fender Equipment Co., Boyce Bldg., Chicago, Ill.

HUTCHINGS—See Safety Fender Co.

SAFETY Fender Co., 30-32 N. Dearborn St., Chicago, Ill. "Hutchings."

MUD FENDERS

(See Guards, Mud)

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HARD FIBRE

(Sheet, Rod and Tube)

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CONCRETE Fibre Co., Ford & Lafayette Sts., Norristown, Pa.

CONTINENTAL Fibre Co., Newark, Del. (See page 165.)

DELAWARE Hard Fibre Co., Wilmington, Del.

DIAMOND State Fibre Co., Elsmere, Del. (See page 165.)

EASTERN Hard Fibre Co., 50 Church St., New York, N. Y. (See page 639.)

EMPIRE Mfg. Co., 26th & Tatnall Sts., Wilmington, Del.

KEYSTONE Fibre Co., 14th & Crosby Sts., Chester, Pa.

NATIONAL Fibre & Insulation Co., Wilmington, Del.

SPAULDING & Sons Co., J., Wheeler St., Tonawanda, N. Y.

STANDARD Fibre Co., Miller St., Somerville, Mass.

WILMINGTON Fibre Specialty Co., Wilmington, Del. (See page 165.)

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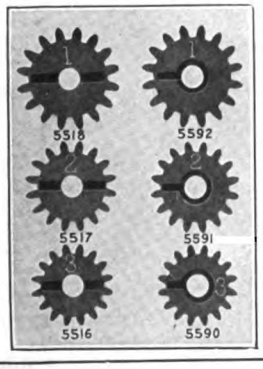

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BERRY Bros., Detroit, Mich. "Lionoil."

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BRIDGEPORT Wood Finishing Co., New Milford, Conn. "Wheelers."

C. Q. P.—See Bradley & Vrooman Co.

CAPITOL CITY—See Indianapolis Paint & Color Co.

CELOX—See Valentine & Co.

CHASE, Roberts & Co., Fifth St. & West Ave., Long Island City, N. Y.

CHICAGO Varnish Co., 2100 Elston Ave., Chicago, Ill. "Chi-Var-Co."

CHI-VAR-CO.—See Chicago Varnish Co.

CINCINNATI Color Co., Eighth & Evans Sts., Cincinnati, O.

DITZLER Color Co., 18 W. Baltimore Ave., Detroit, Mich.

FLINT Varnish Works, Flint, Mich.

FLOOD & Conklin Co., 136 Chestnut St., Newark, N. J.

FOREST City Paint & Varnish Co., 3334 Lakeside Ave., Cleveland, O.

GRAVES Co., N. Z., 22-26 S. Third St., Philadelphia, Pa.

HARDY Paint & Varnish Co., Toledo, O.

HILDRETH Varnish Co., 90 West St., New York, N. Y.

INDIANAPOLIS Paint & Color Co., 113 W. Chesapeake St., Indianapolis, Ind. "Capitol City."

JOHNSTON Paint Co., R. F., Cincinnati, O. "Krakno."
(See page 155.)

KEYSTONE Paint & Filler Co., Muncy, Pa.

KRAKNO—See Johnston Paint Co.

LIONOIL—See Berry Bros.

MASURY & Son, John W., New York, N. Y.

MOLLER & Schumann Co., Marcy & Flushing Aves., Brooklyn, N. Y.

MOSER Co., Chas., Cincinnati, O.

MOUND City Paint & Color Co., 11th & Mullanphy Sts., St. Louis, Mo.

MURPHY Varnish Co., Chestnut & McWhorter Sts., Newark, N. J.

NELSON Color Co., Amesbury, Mass.

NICE, Eugene E., 272 S. Second St., Philadelphia, Pa.

PHOENIX Paint & Varnish Co., 124 Market St., Philadelphia, Pa.

RENO Bros. Paint Co., Pulaski, Pa.

ST. LOUIS Surfacer & Paint Co., Arlington Ave. & Terminal Belt Line, St. Louis, Mo.

SCHRACK & Co., 152 N. Fourth St., Philadelphia, Pa.

SMITH & Co., Edward, Sixth St. & West Ave., Long Island City, N. Y.

VALENTINE & Co., 456 Fourth Ave., New York, N. Y. "Celox."

VESTAL Paint Co., Vestal, N. Y.

WHEELERS—See Bridgeport Wood Finishing Co.

WILHELM Co., A., Third & Bern Sts., Reading, Pa.

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RADIATOR FINS

(See Discs, Radiator)

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CURTAIN OPENING FITTINGS

DAYTON Top Improvement Co., Steely Bldg., Dayton, O.

ERVIEN, Horace, Ogontz, Pa.

KELLY & Towers, 1618 Walnut Ave., Cleveland, O. "Towers."

TOWERS—See Kelly & Towers.

PIPE FITTINGS

(For Tubing or Brazing Fittings—See Tubing Unions)

BARD Union Co., Norwich, Conn.

BARRETT Mfg. Co., James, 50 Pearl St., Boston, Mass.

BELFIELD Co., H., 435 N. Broad St., Philadelphia, Pa.

BUCKEYE Iron & Brass Works, 324 E. Third St., Dayton, O.

CRANE Co., 836 S. Michigan Ave., Chicago, Ill.

DALTON-INGERSOLL Mfg. Co., 171-75 High St., Boston, Mass.

GRIP Coupling Co., Ware, Mass.

HAMLIN & Emery Brass Co., 49 Island St., Boston, Mass.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

JARECKI Mfg. Co., Erie, Pa.

KELLY & Jones Co., Greensburg, Pa.

KINSEY & Mahler Co., 400 S. Adams St., Peoria, Ill.

LAVIGNE Mfg. Co., 625-41 Commonwealth Ave., Detroit, Mich.

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O.

McDONALD Mfg. Co., A. Y., Dubuque, Ia.

McNAB & Harlin Mfg. Co., 55 John St., New York, N. Y.

McRAE & Roberts Co., 221-35 Campbell Ave., Detroit, Mich.

MICHIGAN Lubricator Co., 661-73 Beaubien St., Detroit, Mich.

PITTSBURG Valve & Fittings Co., Barberton, O.

POWELL Co., Wm., 2521-31 Spring Grove Ave., Cincinnati, O.

POWHATAN Brass & Iron Works, Ranson, W. Va.

QUEEN City Brass & Iron Works, Spring Grove Ave., Cincinnati, O.

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Like the Purr of a Kitten—An Engine Running on American Bearings

THAT sixth sense of the chauffeur, the motor boat enthusiast, the engineer—that mysterious influence which tells him his machinery is running perfectly, not only to the outside observer, but to himself, is the real judge of good bearings. An engine or machine may be running perfectly in every other respect, but if the bearings are wearing on account of poor material, if they are not exactly fitted to the shaft, they can cause enough trouble to throw the entire machine out of harmony.

We claim to make unusually fine bearings and bushings. We make them as nearly perfect as it is possible to make them. The selection of the bronze, babbitt and compositions that enter into their making is our first care; to see that they are cast and machined to the most exacting requirements is our hobby. Naturally, the result is a product that is vastly superior to the ordinary article.

And right here is a remarkable fact. While our bearings are unquestionably better—(you'll admit this after you've seen and tried them)—they are not expensive. Owing to the fact that we specialize on making this product unusually good, we have a large business worked up on bearing parts, and consequently we can quote exceedingly low prices.

We have 1600 stock patterns and sizes to select from. Send us your blue prints and we'll submit surprisingly low estimates and catalog without any obligation whatever.

We also manufacture Plain Bushings, Flanged Bushings, Babbitt Lined Bushings, Oil Pumps, Water Pumps, Tire Pumps, Overflow Valves, Tank Caps, Filler Caps, Foot Pedals, Trunnion Brackets and Adjusting Nuts.

Our excellent shipping facilities enable us to promptly fill all orders. Send us your specifications for anything in finished brass or bronze, phosphor-bronze, manganese bronze and aluminum. Write for catalog.

American Car & Ship Hardware Mfg. Co.

Dept. "T" **New Castle, Penna.**

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FITTINGS (Continued)

PIPE FITTINGS (Continued)

RICHARDSON-PHENIX Co., 122-28 Reservoir Ave., Milwaukee, Wis. "Union Cinch."

RUNDLE-SPENCE Mfg. Co., 67 Second St., Milwaukee, Wis.

SHERMAN Mfg. Co., H. B., 12 Barney St., Battle Creek, Mich.

STODDARD Union Co., Lockport, N. Y.

UNION CINCH—See Richardson-Phenix Co.

WALWORTH Mfg. Co., Boston, Mass.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

TOP FITTINGS AND FIXTURES

(See also Bows, Top; also Fasteners, Curtain; also Irons, Slat; also Irons, Top; also Rests, Bow; also Separators, Bow; also Sockets, Bow; also Straps, Top)

AMESBURY Brass & Foundry Co., Amesbury, Mass.

BLAKESLEE Forging Co., Plantsville, Conn.

COLUMBUS Bolt Works, 162 W. Randolph St., Columbus, O.

CORTLAND Carriage Goods Co., 115 Pt. Watson St., Cortland, N. Y.

CORTLAND Forging Co., Cortland, N. Y.

CRANDAL, Stone & Co., Binghamton, N. Y.
(See page 369.)

DOUGLAS & Lomason Co., Detroit, Mich.
(See page 211.)

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

GARAGE Equipment Mfg. Co., Milwaukee, Wis.
(See page 83.)

HIGGIN Mfg. Co., Newport, Ky.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

MONARCH Carriage Goods Co., 2838-44 Spring Grove Ave., Cincinnati, O.

NEWTON & Son, W. H., 127 Elm St., Cortland, N. Y.

SCHERER & Co., H., Detroit, Mich.

SMITH & Co., Jos. N., Detroit, Mich.
(See page 547.)

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

FLAGS

FLAGS, PENNANTS AND EMBLEMS

AMERICAN Pennant Co., 69-71 Greene St., New York, N. Y.

CHICAGO Pennant Co., 1224 E. 63d St., Chicago, Ill.

KOSMOS-ART Co., 120 E. Sixth St., Cincinnati, O.

LUXEMOOR Co., 114 E. 13th St., New York, N. Y.

MASSARI Co., H. W., 29 E. Madison St., Chicago, Ill.

ORCUTT & Co., J. C., 134 S. 13th St., Lincoln, Neb.

SPIEGEL Art Co., 111 Broadway, Brooklyn, N. Y.

FLANGES

PRESSED STEEL HUB FLANGES

(For Forged or Cast Flanges—See Forgings; also Castings)

AVERY Stamping Co., 5209 Lakeside Ave., Cleveland, O.

BOSSERT Co., Utica, N. Y.
(See page 223.)

BUFFALO Pressed Steel Co., Military Rd. & Lansing St., Buffalo, N. Y.

CROSBY Co., Buffalo, N. Y.
(See page 157.)

DETROIT Pressed Steel Co., 1800 Mt. Elliott Ave., Detroit, Mich.
(See page 555.)

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

FEDERAL Pressed Steel Co., Milwaukee, Wis.
(See page 157.)

GIER & Dail Mfg. Co., Lansing, Mich.

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O.
(See page 81.)

IRELAND & Matthews Mfg. Co., 51-79 Iron St., Detroit, Mich.

KELSEY Wheel Co., Detroit, Mich.

KONIGSLOW Mfg. Co., Otto, E. 35th St. & Perkins Ave., Cleveland, O.

WORCESTER Pressed Steel Co., Worcester, Mass.
(See page 157.)

FLOATS

CORK FLOATS

ARMSTRONG Cork Co., 23d St. & Railroad Ave., Pittsburg, Pa.
(See page 215.)

DIAMOND Cork Co., 59 Pearl St., New York, N. Y.

MUNDET & Son, L., King, Ferris & Sullivan Sts., Brooklyn, N. Y.

PADDOCK Cork Co., 1209-17 DeKalb Ave., Brooklyn, N. Y.

SPANISH-AMERICAN Cork Co., 2211 Pennsylvania Ave., Baltimore, Md.

METAL FLOATS

FITZGERALD Mfg. Co., Torrington, Conn.
(See page 219.)

GOODNOW & Blake Mfg. Co., Fourth & Porter Sts., Detroit, Mich.

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at a lower cost than you can handle them in your own sheet metal department

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FLOATS (Continued)

METAL FLOATS (Continued)

GOODWIN & Kintz Co., Winsted, Conn.

HERCULES Float Works, 200-10 Franklin St., Springfield, Mass.

IMPERIAL Brass Mfg. Co, 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

NAUGATUCK Mfg. Co., Naugatuck, Conn.

WORCESTER Pressed Steel Co., Worcester, Mass.
(See page 157.)

FORGINGS

DROP FORGINGS

ACCESSORY Forgings Co., Detroit, Mich.

ANDERSON Forge & Machine Co., Detroit, Mich.
(See page 171.)

ATLAS Drop Forge Co., Lansing, Mich.
(See page 217.)

ATWATER Mfg. Co., Southington, Conn.

BALDWIN Steel Co., Charleston, W. Va.

BARNETT Drop Forging Co., East Hampton, Mass.
(See page 265.)

BELDEN Machine Co., Whalley Ave. & Tryon St., New Haven, Conn.

BETHLEHEM Steel Co., Third & Poplar Sts., South Bethlehem, Pa.

BILLINGS & Spencer Co., Hartford, Conn.

BLAKESLEE Forging Co., Plantsville, Conn

BUFFALO Drop Forge Co., 53-59 Carroll St., Buffalo, N. Y.

CANTON Drop Forging & Mfg. Co., Canton, O.
(See page 469.)

CAPE Ann Tool Co., Granite St., Pigeon Cove, Mass.

CHAMPION Machine & Forging Co., 3725 E. 78th St., Cleveland, O.
(See page 633.)

CHICAGO Drop Forge & Foundry Co., 447-517 Kensington Ave., Chicago, Ill.

CHRISTIE-KLINE Forge Co., 60 St. Aubin Ave., Detroit, Mich.

CLAPP Mfg. Co., E. D., Auburn, N. Y.

CLEVELAND Hardware Co., Cleveland, O.

COLUMBIAN Hardware Co., 1296 E. 53d St., Cleveland, O.

COLUMBUS Bolt Works, 162 W. Randolph St., Columbus, O.

COLUMBUS Forge & Iron Co., Columbus, O

CONSOLIDATED Mfg. Co., Toledo, O.

CORTLAND Forging Co., Cortland, N. Y.

CRESCENT Forgings Co., Oakmont, Pa.

DEAN Forging Co., 1825 E. Jackson St., Muncie, Ind.

DETROIT Forging Co., 120 Mt. Elliott St., Detroit, Mich.

DETROIT Steel Products Co., 2290 E. Grand Boulevard, Detroit, Mich.
(See page 493.)

DIAMOND Forging & Mfg. Co., Pittsburg, Pa.

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

DROP Forging Co. of New York, West Side Ave. & Fisk St., Jersey City, N. J.

ECCLES Co., Richard, Auburn, N. Y.
(See page 533.)

ELLIOTT, H. A., Majestic Bldg., Detroit, Mich. (Importer.)

EMERGENCY Forge Co., Lansing, Mich.
(See page 175.)

EUREKA Co., North East, Pa.
(See page 257.)

FOREST City Electric Co., 5003 Windsor Ave., Cleveland, O.
(See page 405.)

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. (Importers.)
(See page 425.)

FROST Gear & Forge Co., Jackson, Mich.
(See page 187.)

FRUIN Drop Forge Co., 347 Root St., Chicago, Ill.

FULTON Machine & Forging Co., Canal Fulton, O.

GENERAL Drop Forge Co., Buffalo, N. Y.
(See page 277.)

GLOBE Malleable Iron & Steel Co., Syracuse, N. Y.

HENRY & Allen, Arelius Ave., Auburn, N. Y.

HERBRAND Co., Fremont, O.

HERCULES Forge Co., S. Senate Ave. & Merrill St., Indianapolis, Ind.

HIGGINS Spring & Axle Co., 1314 16th St., Racine, Wis.
(See page 395.)

INDIANAPOLIS Drop Forging Co., Madison Ave. & Dowling St., Indianapolis, Ind.

INGALLS-SHEPARD Forging Co., Michigan Ave. & Van Buren St., Chicago, Ill.
(See page 435.)

JACKSON Drop Forging Co., Jackson, Mich.

KILBORN & Bishop Co., Chapel & Lloyd Sts., New Haven, Conn.

KROPP Forge Co., 2508-22 W. 21st St., Chicago, Ill.

KRUPP—See Prosser & Son.

LAKESIDE Forge Co., East Lake Rd., Erie, Pa.

MACHINERY Forging Co., Hamilton & Marquette Sts., Cleveland, O.

MARTIN Forging Co., H. J., 510 Harding St., Indianapolis, Ind.

MERRILL Bros., Maspeth, N. Y.

MICHIGAN Bolt & Nut Works, ft. Meldrun Ave., Detroit, Mich.

MOORE Drop Forging Co., Birnie Ave. Springfield, Mass.

NEW England Forge Co., 9 Plymouth St. Worcester, Mass.

O. K. Tool Holder Co., Shelton, Conn.

OBENBERGER Drop Forge Co., Milwaukee, Wis.
(See page 525.)

OHIO Forge Co., Cleveland, O.
(See page 473.)

OLIVER Iron & Steel Co., Pittsburg, Pa.

PAGE-STORMS Drop Forge Co., Chicopee, Mass.

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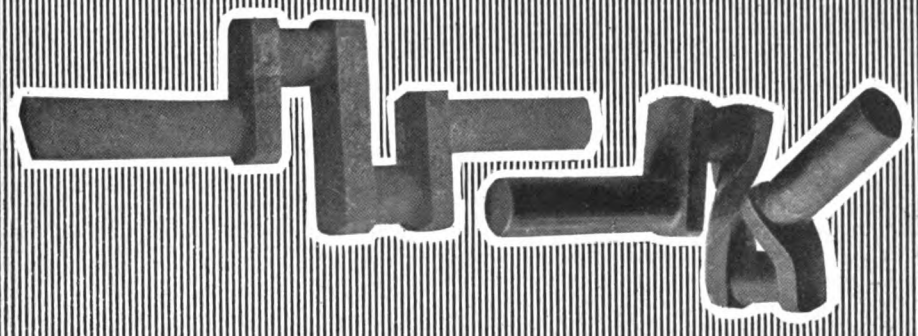
Drop Forgings



Some manufacturers buy on a quality basis; others buy on price. While quality is the prime consideration in the production of all our forgings we can satisfy every customer on price.

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Anderson Forge & Machine Company.

DETROIT, MICHIGAN.

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FORGINGS (Continued)

DROP FORGINGS (Continued)

PARK Drop Forge Co., Cleveland, O. (See page 79.)

PONTIAC Drop Forge Co., Pontiac, Mich.

PORTLAND Foundry & Machine Co., Portland, Ind.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp." (See page 387.)

QUEEN City Forging Co., Cincinnati, O.

RACINE Drop Forge Co., Racine, Wis.

REVERE Drop Forge Co., Revere, Mass.

RICHMOND Forging Corp. (Acca Station), Richmond, Va.

RIVETLESS Chain & Engineering Co., Avon, Pa.

SEWARD & Son Co., M., Grant St., New Haven, Conn.

SMITH Co., A. O., Milwaukee, Wis. (See page 367.)

SMITH & Co., H. D., Plantville, Conn.

SPICER Mfg. Co., Plainfield, N. J. (See page 229.)

STANDARD Welding Co., Cleveland, O. (See Book Mark.)

STRIEBY & Foote Co., 301 Ogden St., Newark, N. J.

SUNDBERG Co., Kinzie & Carpenter Sts., Chicago, Ill.

TRANSUE & Williams Co., W. Ely St., Alliance, O.

UNION Drop Forge Co., 358 W. Indiana St., Chicago, Ill.

UNION Forging Co., Union, N. Y. (See page 519.)

WAVERLY Co., 139 S. East St., Indianapolis, Ind.

WESTERN Drop Forge Co., Marion, Ind. (See page 473.)

WESTERN Malleable Steel Co., 1250 Jefferson Ave., W., Detroit, Mich.

WESTERN Tool & Forge Co., Brackenridge, Pa.

WHITMAN & Barnes Mfg. Co., Akron, O.

WILCOX, Crittenden & Co., 83 Main St., Middletown, Conn.

WILCOX Mfg. Co., D., Mechanicsburg, Pa.

WILLIAMS & Co., J. H., 150 Hamilton Ave., Brooklyn, N. Y.

WRIGHT Wrench & Forging Co., 1424 Barth Ct., Canton, O.

WYMAN & Gordon Co., Worcester, Mass. (See Back Bone.)

FRAMES

PRESSED STEEL FRAMES

DETROIT Pressed Steel Co., 1800 Mt. Elliott Ave., Detroit, Mich. "Presteel." (See page 555.)

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa. (See page 157.)

FORSYTH Bros. Co., Harvey, Ill.

HYDRAULIC Pressed Steel Co., 3164 E. 61st St., Cleveland, O. (See page 289.)

KINSEY Mfg. Co., Toledo, O.

PARISH Mfg. Co., Reading, Pa. (See page 481.)

PARISH & Bingham Co., Cleveland, O. (See page 173.)

PRESTEEL—See Detroit Pressed Steel Co.

SMITH Co., A. O., Milwaukee, Wis. (See page 367.)

FRICTIONS

FIBRE FRICTIONS

(For use in Friction Transmission)

DIVINE Bros. Co., 202 Whitesboro St., Utica, N. Y.

ROCKWOOD Mfg. Co., 1800 English Ave., Indianapolis, Ind.

GALVANIZING

GALVANIZING, SHERARDIZING AND RUST-PROOFING

AMERICAN Tube & Stamping Co., Bridgeport, Conn.

BONTEMPI Rust Proofing Co., 353 Water St., Bridgeport, Conn. (See page 175.)

BRIDGEPORT Electro Plate Co., 270 Kossuth St., Bridgeport, Conn.

BUFFALO Galvanizing & Tinning Works, 49-53 Jackson St., Buffalo, N. Y.

CLEVELAND Galvanizing Works Co., Cooper Ave. & P. R. R., Cleveland, O.

CRAMP & Sons Ship & Engine Bldg. Co., William, Philadelphia, Pa. (See page 261.)

DANA Mfg. Co., Cincinnati, O.

DOVER Stamping & Mfg. Co., Cambridge, Mass. (See page 139.)

GEUDER, Paeschke & Frey Co., 1363-1700 St. Paul Ave., Milwaukee, Wis. (See page 169.)

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O. (See page 81.)

GRABLER Mfg. Co., Cleveland, O.

MALLEABLE Iron Fittings Co., Branford, Conn. (See page 485.)

MEAKER Co., Fulton & Elizabeth Sts., Chicago, Ill.

METAL Treating & Equipment Co., 834 Humboldt St., Brooklyn, N. Y.

NATIONAL Galvanizing Co., 1918-26 Carroll Ave., Chicago, Ill.

NEW England Sherardizing Co., Hartford, Conn.

NEW Haven Sherardizing Co., State & Lawrence Sts., New Haven, Conn.

NEWARK Stamping Co., Newark, O.

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GALVANIZING (Continued)

GALVANIZING, SHERARDIZING AND RUST-PROOFING (Continued)

OHIO Sherardizing Co., Whitney Power Blk., Cleveland, O.

R. I. Welding & Sherardizing Co., Promenade & Park Sts., Providence, R. I.

SCOTT, C. U., head of Wall St., Davenport, Ia.

SHERARDIZING Co. of Illinois, 567 W. Van Buren St., Chicago, Ill.

STANLEY Works, Dept. U., New Britain, Conn.
(See page 211.)

UNION Elevator & Machine Co., 215-17 W Ontario St., Chicago, Ill.

U. S. Electro-Galvanizing Co., 1-9 Park Ave., Brooklyn, N. Y.

VAIL Galvanizing Plant, 209-11 Commercial St., Boston, Mass.

VOGEL & Bros., Wm., Kent Ave., Brooklyn, N. Y.

GAPS

SPARK GAPS

ACME—See Sheer Co.

B. & M. Mfg. Co., 538 Muskego Ave., Milwaukee, Wis.

BREMER & Mooney Mfg. Co., 538 Muskego St., Milwaukee, Wis.

CHAMPION Spark Plug Co., 1010 Avondale Ave., Toledo, O. "Misskip."
(See pages 297, 298, 299 and 300.)

CUT-OUT Switch Co., Broadway & 195th St., New York, N. Y.

DALITZ Mfg. Co., 3134 Payne Ave., Cleveland, O.

DOXEY & Doxey, 2132 S. Michigan Ave., Chicago, Ill.

HEMMETER Spark Gap Mfg. Co., Dime Bank Bldg., Detroit, Mich.

HERZ & Co., 245 W. 55th St., New York, N. Y. "Oscillum."
(See page 311.)

MANVILLE, Geo. W., Bridge St., Towanda, Pa.

MEANS, Eugene D., Towanda, Pa.

MISSKIP—See Champion Spark Plug Co.

MOSLER & Co., A. R., Box M, Mt. Vernon, N. Y.
(See page 303.)

NOTAMISS Spark Gap Co., Hippee Bldg., Des Moines, Ia.

OSCILLUM—See Herz & Co.

RUTLEDGE, Uel Alvin, Charlotte, N. C.

SHEER Co., H. M., Quincy, Ill. "Acme."

SMITH & Gunn, 22-26 E. Broad St., Burlington, N. J.

T. A. D.—See Toledo Auto Devices Co.

TOLEDO Auto Devices Co., Gardner Bldg., Toledo, O. "T. A. D."

X-RAY Spark Indicator Co., Pleasant Lake, Ind.

GARAGES

PORTABLE GARAGE BUILDINGS

ALADDIN—See North American Construction Co.

AMERICAN Portable House Co., Arcade Bldg., Seattle, Wash.

ANCHOR Corrugating Construction Co., 62 Cortlandt St., New York, N. Y.

BELMONT-STEWART Iron Works, 6 Beacon St., Boston, Mass.

BURNHAM-STANDEFORD Co., Washington & First Sts., Oakland, Cal.

CATHERMAN, J. A., Beaver Springs, Pa.

CHESBRO-WHITMAN Co., 1167 First Ave., New York, N. Y.

CORNELL—See Wyckoff Lumber & Mfg. Co.

CRAIG, David, 70 Broad St., Boston, Mass.

DUCKER Co., 277 Broadway, New York, N. Y.

DULUTH Corrugating & Roofing Co., Duluth, Minn.

EDWARDS Mfg. Co., 724-74 Eggleston Ave., Cincinnati, O. "Steelcote."

ESLIEN Sheet Metal Works, 1001 30th St., Milwaukee, Wis.

FARGO Cornice & Ornament Co., 1002-04 Front St. Fargo, N. Dak. "Rusk."

GORDON Mfg. Co., Middletown, O.

HARRY Steel Co., O. K., 2333-35 Papin St., St. Louis, Mo.

HODGSON Co., E. F., 116 Washington St., Boston, Mass.

IDEAL Sectional Building Co., St. Johns, Mich.

ILLINOIS Portable House Co., 6331-33 Evanston Ave., Chicago, Ill.

KARR Portable House Co., 2554 W. Irving Park Blvd., Chicago, Ill.

KENYON Co., R. L., Waukesha, Wis.

MERSHON & Morley Co., Saginaw, Mich.

METAL Shelter Co., 17 Battery Pl., New York, N. Y. "Pruden."

NORTH American Construction Co., Bay City, Mich. "Aladdin."

PINYOUN & Son, F. C., 2526 Carnegie Ave., Cleveland, O.

PRUDEN—See Metal Shelter Co.

PRUDEN Co., C. D., Warner, Dock & Bayard Sts., Baltimore, Md. "Prudential."

PRUDENTIAL—See Pruden Co.

RIVERSIDE Mfg. Co., 162-66 Riverside Ave., Newark, N. J.

ROGERS Co., J. S., Moorestown, N. J.

RUBY Mfg. Co., Jackson & Douglass Sts., Jackson, Mich.

RUSK—See Fargo Cornice & Ornament Co.

SECTIONAL Steel Garage Co., 985 Dix Ave., Detroit, Mich.
(See page 521.)

STEEL Portable Building Co., Chicago, Ill.

STEELCOTE—See Edwards Mfg. Co.

TAYLOR Mfg. Co., 219 Glenridge Ave., Montclair, N. J.

WYCKOFF Lumber & Mfg. Co., Ithaca, N. Y. "Cornell."

ZETTERMAN Machinery Co., 6 Beacon St., Boston, Mass.

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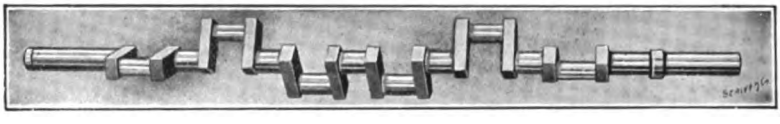

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GASKETS

METALLIC GASKETS

(For Asbestos, Composition or Rubber Gaskets—See Packing)

AKRON Metallic Gasket Co., 151 N. Union St., Akron, O.

FITZGERALD Mfg. Co., Torrington, Conn. "Never-Leak." (See page 219.)

GASKET Supply Co., 1729 Ludlow St., Philadelphia, Pa. "Right."

GASTITE—See Goodwin & Kintz Co.

GOODWIN & Kintz Co., Winsted, Conn. "Gastite."

HERZ & Co., 245 W. 55th St., New York, N. Y. (Importers.) (See page 311.)

KINSEY Mfg. Co., Toledo, O. "Kinwood."

KINWOOD—See Kinsey Mfg. Co.

McCORD Mfg. Co., Detroit, Mich. "McKim." (See pages 178 and 179.)

McKIM—See McCord Mfg. Co.

MICHIGAN Stamping Co., 759-71 Bellevue Ave., Detroit, Mich.

NEVER-LEAK—See Fitzgerald Mfg. Co.

PHOENIX Specialty Mfg. Co., 48-50 Duane St., New York, N. Y.

RIGHT—See Gasket Supply Co.

UNITED States Indestructible Gasket Co., 50 Church St., New York, N. Y.

VICTOR Mfg. & Gasket Co., Troy & 21st Sts., Chicago, Ill.

GASOLINE

AUTOMOBILE GASOLINE

BUCK & Co., E. A., Worcester, Mass. "Powers."

CREW Levick Co., Land Title Bldg., Philadelphia, Pa.

EMCO—See Emery Mfg. Co.

EMERY Mfg. Co., Bradford, Pa. "Emco."

ENERGINE Refining & Mfg. Co., The Arcade, Cleveland, O.

GULF Refining Co., Pittsburg, Pa. (See page 279.)

NATIONAL Refining Co., Rose Bldg., Cleveland, O. "White Rose."

PETROLEUM Products Co., 3600-10 Grant Blvd., Pittsburg, Pa. "Vigorite."

POWERS—See Buck & Co.

PURE Oil Co., Fifth & Chestnut Sts., Philadelphia, Pa.

STANDARD Oil Co. of N. Y., New York, N. Y.

TEXACO—See Texas Co.

TEXAS Co., 17 Battery Pl., New York, N. Y. "Texaco."

TIONA Refining Co., Madison Ave., & Belt Ry., Indianapolis, Ind.

ULLER, C. C., Tidioute, Pa.

VIGORITE—See Petroleum Products Co.

WAVERLY Oil Works Co., 54th St. & A. V. R. R., Pittsburg, Pa.

WHITE ROSE—See National Refining Co.

GATES

AUTOMATIC DRIVEWAY GATES

BYERLY—See Cargill Mfg. Co.

CARGILL Mfg. Co., West End of Buttles Ave., Columbus, O. "Byerly."

MANLOVE Gate Co., 17 W. Huron St., Chicago, Ill.

GAUGES

BATTERY GAUGES

(Pocket Battery Testers. For Standard Instruments—See Ammeters)

ADVANCE—See Eldredge Electric Mfg. Co.

AMERICAN Ever Ready Co., 316 Hudson St., New York, N. Y. "Ever Ready."

CLARK Electric Meter Co., 219 S. Clinton St., Chicago, Ill.

CONNECTICUT Telephone & Electric Co., Meriden, Conn. (See page 401.)

DOW Mfg. Co., 131 Adams St., Braintree, Mass.

ELCO—See Eldredge Electric Mfg. Co.

ELDREDGE Electric Mfg. Co., 7 Post Office Sq., Springfield, Mass. "Advance," "Elco."

EVER READY—See American Ever Ready Co.

HOYT Electrical Instrument Works, Penacook, N. H. "Triune," "Utimate." (See page 177.)

LUCAS Electric Devices Co., Western & Warren Aves., Chicago, Ill.

PENNSYLVANIA Rubber & Supply Co., 1845-47 Euclid Ave., Cleveland, O. "Prsco."

PIGNOLET, Louis M., 78 Cortlandt St., New York, N. Y.

PRSCO—See Pennsylvania Rubber & Supply Co.

READRITE Meter Works, 22 Main St., Bluffton, O.

RELIANCE Instrument Co., 1135 Van Buren St., Chicago, Ill.

ROBERT Instrument Co., 56 Shelby St., Detroit, Mich.

SHOLDER-EXCEL Mfg. Co., Clyde, O.

STERLING Mfg. Co., 321 Frankfort Ave., Cleveland, O.

TRIUNE—See Hoyt Electrical Instrument Works.

TROY Electrical Co., River & State Sts., Troy, N. Y.

ULTIMATE—See Hoyt Electrical Instrument Works.

WAGNER Electric Mfg. Co., 6400 Plymouth Ave., St. Louis, Mo.

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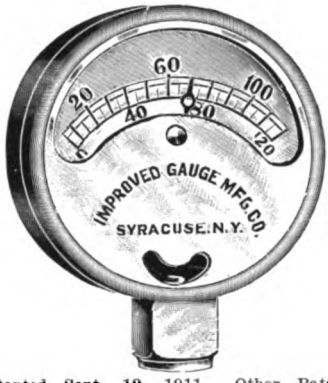

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Improved Gauge Mfg. Co.
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HOYT ELECTRICAL INSTRUMENT WORKS
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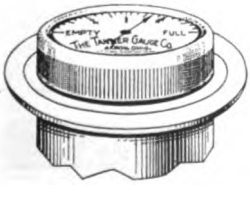
are the Standard Equipment on the leading Motor Cars—such cars as—



Peerless	L. P. C.	Velie	Imperial	Pullman
McFarlan	Abbott	Pathfinder	KisselKar	Willys-Knight
Haynes	Mitchell-	Hudson	Chalmers	Cartercar
Case	Lewis	Winton	Westcott	National
Stearns	Keeton	Chevrolet	Jeffery	Premier
Stutz	Crow	S. G. V.	Page-Detroit	

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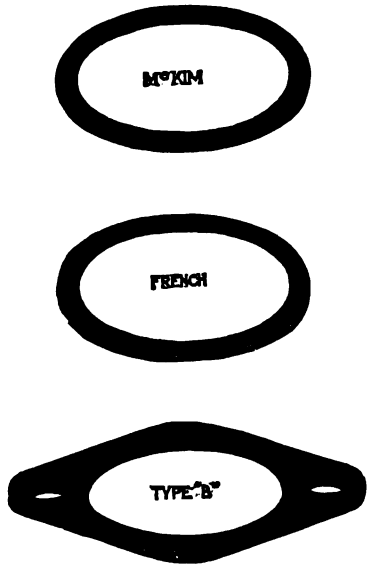

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GAUGES (Continued)

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(For indicating height of water in steam boilers)

ASHTON Valve Co., 271 Franklin St., Boston, Mass.

RELIABLE Water Gauge Co., 1616 Pine St., St. Louis, Mo.

SCHAEFFER & Budenberg Mfg. Co., 481 De Kalb Ave., Brooklyn, N. Y.

WILTBONCO Mfg. Co., 10 Post Office Sq., Boston, Mass.

CYLINDER COMPRESSION GAUGES

(For testing compression in gas engine cylinders)

AZADIAN Gauge Mfg. Co., 107 N. Franklin St., Syracuse, N. Y.

BROWN Co., 213 Bellevue Ave., Syracuse, N. Y.

EDELMANN & Co., E., 225 W. Illinois St., Chicago, Ill.

FOXBORO Co., Foxboro, Mass.

MAYO Mfg. Co., 58 E. 18th St., Chicago, Ill.
(See page 325.)

UNITED States Gauge Co., New York, N. Y.
(See page 181.)

GASOLINE TANK GAUGES

(For indicating amount of gasoline in fuel tanks)

AZADIAN Gauge Mfg. Co., 107 N. Franklin St., Syracuse, N. Y.

BOSTON Auto Gage Co., 8 Waltham St., Boston, Mass. "Triumph," "Challenge."
(See page 177.)

BUSH Mfg. Co., Hartford, Conn.
(See page 207.)

CARR Sight & Signal Gauge Co., 694 Woodward Ave., Detroit, Mich.

CHALLENGE—See Boston Auto Gage Co.

DEPENDO—See Roper & Co.

EUREKA Gauge Co., Majestic Bldg., Detroit, Mich.

EVERETT Mfg. Co., 162-64 N. May St., Chicago, Ill.

FREER—See Tanner-Hower Mfg. Co.

FUEL Meter Co., 937 E. 54th St., Chicago, Ill.

GOODNOW Mfg. Co., Old South Bldg., Boston, Mass.

HANS Motor Equipment Co., La Crosse, Wis.

HYDRO-CATOR—See Sterling Gauge Co.

IMPERIAL Fluid Gauge Co., Canton, O.

JOHNSTON, J. E., 133 E. Lancaster Ave., Ardmore, Pa.

KALES-HASKEL Co., 441-53 Lafayette Blvd., Detroit, Mich.

LIPMAN Mfg. Co., 211 Pleasant St., Beloit, Wis.

LUCAS Electric Devices Co., Western & Warren Aves., Chicago, Ill.

MODERN Specialty Co., Racine, Wis.

PALMER Gauge Co., Dwight Bldg., Jackson, Mich.

PFAHL Gauge & Mfg. Co., Hamilton Bldg., Akron, O.

RITZ GASOMETER—See Ritz-Woller, Oliver C.

RITZ-WOLLER, Oliver C., 536-38 S. Clark St., Chicago, Ill. "Ritz Gasometer."

ROCHESTER Mfg. Co., 347 Blossom Rd., Rochester, N. Y.

ROPER & Co., C. F., Hopedale, Mass. "Dependo."

RUDELL Gasoline Indicator Co., 1716 Crenshaw Blvd., Los Angeles, Cal.

STERLING Gauge Co., 47 Adelaide St., Detroit, Mich. "Hydro-Cator."

TANNER—See Tanner-Hower Mfg. Co.

TANNER-HOWER Mfg. Co., Akron, O. "Freer," "Tanner."
(See page 177.)

TRIUMPH—See Boston Auto Gage Co.

WEISS Mfg. Co., Torrington, Conn.

STEAM AND AIR GAUGES

(Standard Pressure Gauges)

AMERICAN Steam Gauge & Valve Mfg. Co., 220 Camden St., Boston, Mass.

ASHTON Valve Co., 271 Franklin St., Boston, Mass.

AZADIAN Gauge Mfg. Co., 107 N. Franklin St., Syracuse, N. Y.

BELFIELD Co., H., 435 N. Broad St., Philadelphia, Pa.

FOXBORO Co., Foxboro, Mass.

IMPROVED Gauge Mfg. Co., Water & Franklin Sts., Syracuse, N. Y.
(See page 177.)

MARSH & Co., Jas. P., 118-24 S. Clinton St., Chicago, Ill.

MAYO Mfg. Co., 58 E. 18th St., Chicago, Ill.
(See page 325.)

SCHAEFFER & Budenberg Mfg. Co., 481 De Kalb Ave., Brooklyn, N. Y.

STAR Brass Mfg. Co., 108-14 E. Dedham St., Boston, Mass.

UNITED States Gauge Co., New York, N. Y.
(See page 181.)

UTICA Steam Gauge Co., Frankfort, N. Y.

TIRE PRESSURE GAUGES

(For indicating pressure in tires—See also Valves Tire Safety)

ADVANCE Specialty Co., Shinola Bldg., Rochester, N. Y. "Staon."

ALLEN Auto Specialty Co., 1926 Broadway, New York, N. Y. "Tyrometer."
(See page 97.)

ASHTON Valve Co., 271 Franklin St., Boston, Mass.

AZADIAN Gauge Mfg. Co., 107 N. Franklin St., Syracuse, N. Y.

BARNARD Specialty Co., 3300 Maple Ave., Los Angeles, Cal.

BROWN Co., 213 Bellevue Ave., Syracuse, N. Y.

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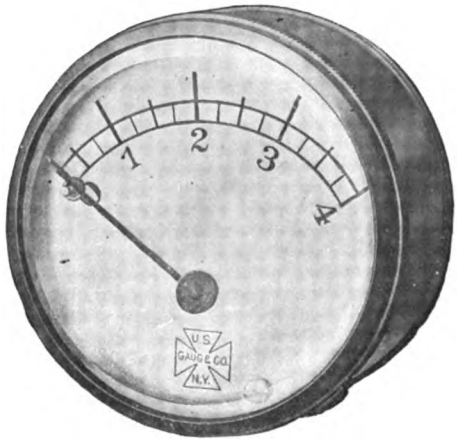
United States Gauge Co.



New York
Chicago
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If It's a Gauge
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GAUGES (Continued)

TIRE PRESSURE GAUGES (Continued)

CODMAN & Shurtleff, 120 Boylston St., Boston, Mass.

EDELMANN & Co., E., 225 W. Illinois St., Chicago, Ill. "Reliable."

FOXBORO Co., Foxboro, Mass.

HANS Motor Equipment Co., La Crosse, Wis.

HILL Pump Valve Co., 18-20 E. Kinzie St., Chicago, Ill. "Pneu-Meter."

IMPROVED Gauge Mfg. Co., Water & Franklin Sts., Syracuse, N. Y. (See page 177.)

INVINCIBLE—See United States Gauge Co.

KELLOGG Mfg. Co., Rochester, N. Y. (See page 325.)

MAYO Mfg. Co., 58 E. 18th St., Chicago, Ill. (See page 325.)

PNEU-METER—See Hill Pump Valve Co.

RELIABLE—See Edelmann & Co.

SCHRADER'S Son, A., 783-91 Atlantic Ave., Brooklyn, N. Y. (See page 441.)

STAON—See Advance Specialty Co.

STEVENS Mfg. & Supply Co., Fischer Bldg., Chicago, Ill.

TWITCHELL Gauge Co., 1208 Michigan Ave., Chicago, Ill. (See page 221.)

TYROMETER—See Allen Auto Specialty Co.

UNITED States Gauge Co., New York, N. Y. "Invincible." (See page 181.)

WATER CIRCULATION GAUGES

(For indicating pressure in water cooling systems)

ASHTON Valve Co., 271 Franklin St., Boston, Mass.

AZADIAN Gauge Mfg. Co., 107 N. Franklin St., Syracuse, N. Y.

FOXBORO Co., Foxboro, Mass.

IMPROVED Gauge Mfg. Co., Water & Franklin Sts., Syracuse, N. Y. (See page 177.)

SCHAEFFER & Budenberg Mfg. Co., 481 De Kalb Ave., Brooklyn, N. Y.

GAUNTLETS

MOTORISTS GAUNTLETS

(See Gloves, Motorists)

GEARS

DIFFERENTIAL GEARS

BARNES Gear Co., Oswego, N. Y.

BOSTON Gear Works, Norfolk Downs, Mass. (See page 185.)

BROWN-LIPE-CHAPIN Co., Syracuse, N. Y. (See page 189.)

CROSS Gear & Engine Co., Detroit, Mich. (See page 293.)

CULLMAN Wheel Co., 1352 Greenwood Terrace, Chicago, Ill. (See page 285.)

DETROIT Standard Gear Co., 742 Woodbridge St., E., Detroit, Mich.

FROST Gear & Forge Co, Jackson, Mich. (See page 187.)

GEARLESS Differential Co., Detroit, Mich. (See page 245.)

GRANT-LEES Gear Co., 2368 69th St., Cleveland, O. (See page 539.)

LEWIS Differential Co., 222 S. Canal St., Chicago, Ill.

M. & S. Gear Co., Kansas City, Mo. "Muehl." (See Inside Back Cover.)

METAL Products Co., Detroit, Mich. (See page 509.)

MUEHL—See M. & S. Gear Co.

NEW Process Gear Corp., Syracuse, N. Y. (See page 201.)

ROSS Gear & Tool Co., 800 Heath St., Lafayette, Ind. (See page 183.)

RUSSEL Motor Axle Co., North Detroit, Mich. (See page 566.)

RUSSEL Wheel & Foundry Co., Detroit, Mich.

WARNER Gear Co., Muncie, Ind. (See page 125.)

WARNER Mfg. Co., Toledo, O. (See page 243.)

RUNNING GEARS

BORBEIN Auto Co., 2109-11 N. Ninth St., St. Louis, Mo.

DART Motor Truck Co., Ainsborough & Stratford Aves., Waterloo, Ia.

FRANKLIN Machine Co., 770 Franklin Ave., Brooklyn, N. Y.

STEERING GEARS

BARNES Gear Co., Oswego, N. Y.

BAYARD & Co., M. L., Woodbine, N. J. "Hindley."

BOSTON Gear Works, Norfolk Downs, Mass. (See page 185.)

CROSS Gear & Engine Co., Detroit, Mich. (See page 293.)

DITWILER Mfg. Co., Galion, O.

FOSTER Gear Co., Columbus, O.

GEMMER Mfg. Co., Detroit, Mich. (See page 598.)

GNOETH Steering Gear Co., 638 Sycamore St., Cincinnati, O.

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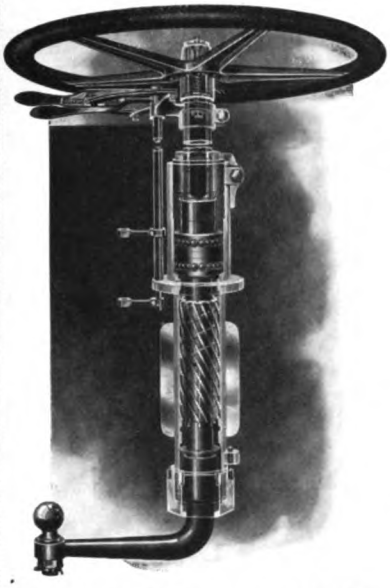

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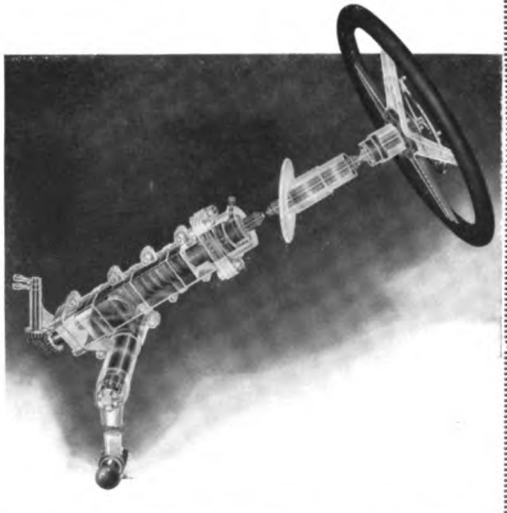

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GEARS (Continued)

STEERING GEARS (Continued)

HINDLEY—See Bayard & Co.

JACKSON-CHURCH-WILCOX Co., Saginaw, W. S., Mich. "Jacox."
(See page 193.)

JACOX—See Jackson-Church-Wilcox Co.

LAVIGNE Gear Co., Racine, Wis.

MASCO—See Motor Appliance Sales Co.

MOTOR Appliance Sales Co., 1110 Chamber of Commerce, Detroit, Mich. "Masco."

ROSS Gear & Tool Co., 800 Heath St., Lafayette, Ind.
(See page 183.)

S. & W.—See Schweppe & Wilt Mfg. Co.

SCHWEPPE & Wilt Mfg. Co., Champlain St. & Meldrum Ave., Detroit, Mich. "S. & W."

SUPERIOR Machine & Engineering Co., 51-53 Fort St., E., Detroit, Mich.

TRIO Mfg. Co., 1192-1206 Bellevue Ave., Detroit, Mich.

UNIVERSAL Mfg. Co., Racine, Wis.

WARNER Co., T. W., Kilgore & Perkins Aves., Muncie, Ind.

WARNER Gear Co., Muncie, Ind.
(See page 125.)

WARNER Mfg. Co., Toledo, O.
(See page 243.)

WILCOX-McKIM Co., Saginaw, Mich.

AUTOMATIC STARTER TRANSMISSION GEARS

(For automatically meshing pinion on starter motor with fly wheel gear)

BENDIX—See Eclipse Machine Co.

ECLIPSE Machine Co., Elmira, N. Y. "Bendix."

TRANSMISSION GEARS

AMERICAN Die & Tool Co., Reading, Pa.
(See page 191.)

AUTOPARTS Mfg. Co., Detroit, Mich.

B-T-K Gear & Engine Co., 620-30 S. Elliot St., Muncie, Ind.

BALL—See New York Gear Works.

BARNES Gear Co., Oswego, N. Y.

BOSTON Gear Works, Norfolk Downs, Mass.
(See page 185.)

BRENNAN Motor Co., 105 Grape St., Syracuse, N. Y.

BROWN-LIPE Gear Co., Syracuse, N. Y.
(See page 189.)

BUDA Co., Harvey, Ill.

CAMPBELL—See Economy Equipping Co.

CLIMAX Electric Works, New Salem, Mass.

COTTA Gear Co., 720-30 Sixth St., Rockford, Ill.

COTTA Transmission Co., 814 S. Main St., Rockford, Ill.
(See page 193.)

COVERT Motor Vehicle Co., Detroit, Mich.
(See page 595.)

CROSS Gear & Engine Co., Detroit, Mich.
(See page 293.)

DART Motor Truck Co., Ainsborough & Stratford Aves., Waterloo, Ia.

DETROIT Gear & Machine Co., Detroit, Mich.
(See page 185.)

DETROIT Standard Gear Co., 742 Wodbridge St., E., Detroit, Mich.

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

ECONOMY Equipping Co., Unity Bldg., Chicago, Ill. "Campbell."

FARMER Mfg. Co., Fordyce & Marston Sts., Detroit, Mich.
(See page 643.)

FRANKLIN Machine Co., 770 Franklin Ave., Brooklyn, N. Y.

FROST Gear & Forge Co., Jackson, Mich.
(See page 187.)

FULLER & Sons Mfg. Co., Kalamazoo, Mich.

GRANT-LEES Gear Co., 2368 69th St., Cleveland, O.
(See page 539.)

JAMESVILLE Mfg. Co., Batavia, N. Y.

KRICK Co., 1373 E. 55th St., Chicago, Ill.

LEFEVER Arms Co., 1 Maitbie St., Syracuse, N. Y.

LIGGETT Spring & Axle Co., Monongahela, Pa.
(See page 129.)

LIGHT Mfg. & Foundry Co., Pottstown, Pa.
(See page 287.)

MECHANICS Machine Co., Ninth St. & 19th Ave., Rockford, Ill.

MOTOR Engineering Co., Cleveland O. "Ruetschi."

MOTOR Mechanism Co., Society of Savings Bldg., Cleveland, O.

MUNCIE Gear Works, Muncie, Ind.
(See page 481.)

NEW YORK Gear Works, 56-58 Greenpoint Ave., Brooklyn, N. Y. "Ball."
(See page 473.)

PARKER Transmission & Appliance Co., Fulton, N. Y.

PITTSBURGH Model Engine Co., Pittsburgh, Pa.
(See page 497.)

ROCHESTER Motors Co., 5 Wren St., Rochester, N. Y.

ROSS Transmission Gear Co., Detroit, Mich.

RUETSCHI—See Motor Engineering Co.

SUPERIOR Machine Tool Co., Kokomo, Ind.

SUPERIOR Machine & Engineering Co., 51-53 Fort St., E., Detroit, Mich.

SYRACUSE Gear Co., 101 Grape St., Syracuse, N. Y.

TURLEY Gear & Machine Co., 1505-11 N. Tenth St., St. Louis, Mo.

WABASH Gear Works, Tenth & Farrington Sts., Terre Haute, Ind.

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UNIT POWER PLANT TRANSMISSIONS TO FIT ALL STANDARD MOTORS UP TO 40 H.P.

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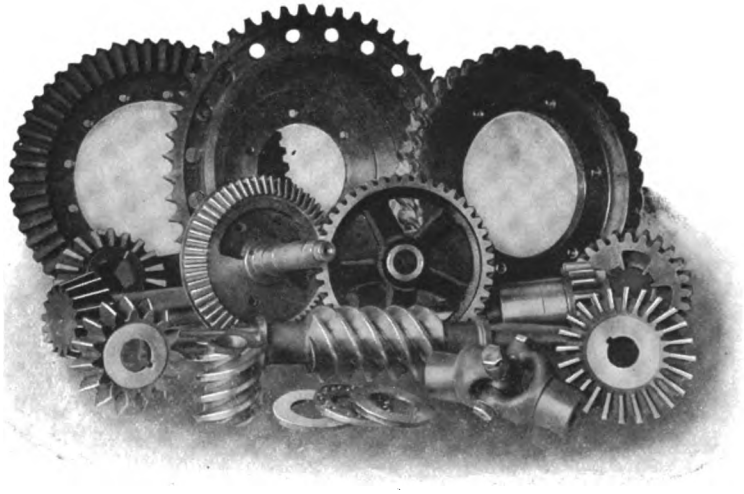

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GEARS (Continued)

TRANSMISSION GEARS (Continued)

WARNER Co., T. W., Kilgore & Perkins Aves., Muncie, Ind.

WARNER Gear Co., Muncie, Ind.
(See page 125.)

WARNER Mfg. Co., Toledo, O.
(See page 243.)

YUSTER Axle & Transmission Co. of America, South Bend, Ind.

BLANK GEARS

(See also Forgings; also Castings)

ANDERSON Forge & Machine Co., Detroit, Mich.
(See page 171.)

ASHLEY Machine Works, 724 University Ave., Rochester, N. Y.
(See page 251.)

B. N. D.—See Elliott, H. A.

BILLINGS & Spencer Co., Hartford, Conn.

BLAKESLEE Forging Co., Plantsville, Conn.

CLEVELAND Hardware Co., Cleveland, O.

COLUMBUS Forge & Iron Co., Columbus, O.

DETROIT Screw Works, Detroit, Mich.
(See page 347.)

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

ELLIOTT, H. A., Majestic Bldg., Detroit, Mich. (Importer.) "B. N. D."

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. (Importers.)
(See page 425.)

GANSCHOW Co., Wm., 1001-05 Washington Blvd., Chicago, Ill.
(See page 191.)

GENERAL Drop Forge Co., Buffalo, N. Y.
(See page 277.)

GILL & Sons Forge & Machine Works, P. H., Lorraine & Otsego Sts., Brooklyn, N. Y.
(See page 175.)

GRANT-LEES Gear Co., 2368 69th St., Cleveland, O.
(See page 539.)

HARTFORD Machine Screw Co., Hartford, Conn.
(See page 301.)

JOLIET Forge Co., Irving & Franklin Sts., Joliet, Ill.

KRUPP—See Prosser & Son.

McINNES Steel Co., Corry, Pa.

MICHIGAN Screw Co., Lansing, Mich.

NEW England Forge Co., 9 Plymouth St., Worcester, Mass.

OBENBERGER Drop Forge Co., Milwaukee, Wis.
(See page 525.)

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp."
(See page 387.)

REESE Machine & Tool Works, S., 224-30 W. Main St., Plymouth, Pa.

U. S. Automatic Co., Amherst, O.

WESTERN Automatic Machine Screw Co., 750 Lake Ave., Elyria, O.
(See page 351.)

WYMAN & Gordon Co., Worcester, Mass.
(See Back Bone.)

METAL GEARS AND PINIONS

ADAMS Co., Dubuque, Ia.

ALBAUGH-DOVER Co., 2100 Marshall Blvd., Chicago, Ill.
(See page 215.)

ALEXANDER & Cox Co., Ogden & Western Aves., Chicago, Ill.

AMERICAN Die & Tool Co., Reading, Pa.
(See page 191.)

ANDERSON Rolled Gear Co., Berea Rd. & L. S. & M. S. R. R., Cleveland, O.

ARTHUR Co., 188 Front St., New York N. Y.

BEHRENDT, H. F., 22 Green St., Newark. N. J.

BILGRAM Machine Works, 1235 Spring Garden St., Philadelphia Pa.

BOSTON Gear Works, Norfolk Downs. Mass.
(See page 185.)

BULTMAN Co., F. H., 2168 Superior Viaduct, Cleveland, O.

CINCINNATI Gear Co., 1825-33 Reading Rd., Cincinnati, O.

CLEVELAND Worm & Gear Co., 990-92 E. 67th St., Cleveland, O.

CROFOOT Gear Works, Haverhill, Mass.
(See page 191.)

CROSS Gear & Engine Co., Detroit, Mich.
(See page 293.)

CURRIE & Son, J. B., 72 Adams St., Brooklyn, N. Y.

DETROIT Gear & Machine Co., Detroit, Mich.
(See page 185.)

DETROIT Standard Gear Co., 742 Woodbridge St., E., Detroit, Mich.

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

EARLE Gear & Machine Co. (Germantown). Philadelphia, Pa.

FLATHER Mfg. Co., E. J., Nashua, N. H.

FOOTE Bros. Gear & Machine Co., 210-20 N. Carpenter St., Chicago, Ill.

FROST Gear & Forge Co., Jackson, Mich.
(See page 187.)

GANSCHOW Co., Wm., 1001-05 Washington Blvd., Chicago, Ill.
(See page 191.)

GEAR Grinding Machine Co., Chene St. & Boulevard, Detroit, Mich.

GLEASON Works, 1000 University Ave., Rochester, N. Y.

GOULD & Eberhardt, N. J. R. R. Ave. & Green St., Newark, N. J.

GRANT-LEES Gear Co., 2368 69th St., Cleveland, O.
(See page 539.)

HAWTHORNE Mfg. Co., 38 Spruce St., Bridgeport, Conn.

HINDLEY Gear Co., 1105 Frankford Ave., Philadelphia, Pa.

HOOSIER Motor Co., Goshen, Ind.

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Our Modern

Gear and Drop Forge Plant

INCLUDING

Chemical Laboratory and Heat Treating Plant

are at your service

SEND US YOUR BLUE PRINTS FOR ESTIMATE

Frost Gear and Forge Co.

JACKSON, MICH.

"The Auto Parts Town"

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GEARS (Continued)

METAL GEARS AND PINIONS (Continued)

JACOBSON Machine Mfg. Co., Warren, Pa. (See page 345.)

KEYSTONE-HINDLEY Gear Co., Pennsylvania Bldg., Philadelphia, Pa.

MEISEL Press Mfg. Co., 944-48 Dorchester Ave., Boston, Mass.

MEISSELBACH-CATUCCI Mfg. Co., Newark, N. J.

MILLHOLLAND Machine Co., W. K., 29th & Canal Sts., Indianapolis, Ind.

NEW England Gear Works, 100 Purchase St., Boston, Mass.

NEW Process Gear Corp., Syracuse, N. Y. (See page 201.)

NEWARK Gear Cutting Machine Co., 67-69 Prospect St., Newark, N. J. (See page 437.)

NILSON-MILLER Co., 18th & Hudson Sts., Hoboken, N. J.

NORTHERN Engineering Works, 2 Chene St., Detroit, Mich.

NUTTALL Co., R. D., McCandless St. & Harrison Ave., Pittsburg, Pa.

PENNSYLVANIA Gear Works, 437 N. Broad St., Philadelphia, Pa.

PHILADELPHIA Gear Works, 1120 Vine St., Philadelphia, Pa.

ROSS Gear & Tool Co., 800 Heath St., Lafayette, Ind. (See page 183.)

ROSS Machine Co., 208 S. Fourth St., La Fayette, Ind.

RUSSEL Wheel & Foundry Co., Detroit, Mich.

SAWYER Gear Works, 227 St. Clair St., Cleveland, O.

SIER-BATH Co., 143 W. 54th St., New York, N. Y. (See page 437.)

SOUTH Park Mfg. Co., Port Huron, Mich.

SPACKE Machine Co., F. W., Indianapolis, Ind. (See page 253.)

SYRACUSE Rawhide Mfg. Co., Niagara & Shonnard Sts., Syracuse, N. Y.

T. C. M. Mfg. Co., Hunterdon & First Sts., Harrison, N. J.

TIMKEN David Brown Co., Detroit, Mich.

TURLEY Gear & Machine Co., 1505-11 N. Tenth St., St. Louis, Mo.

VAN Dorn & Dutton Co., Cleveland, O. (See page 443.)

WABASH Gear Works, Tenth & Farrington Sts., Terre Haute, Ind.

WARNER Gear Co., Muncie, Ind. (See page 125.)

WESTERN Gear & Mfg. Co., Frederick Ave. & G. T. R. R., Detroit, Mich.

WOBURN Gear Works, 32 Nashua St., Woburn, Mass.

WORCESTER Gear Works, 31 N. Foster St., Worcester, Mass.

RAWHIDE GEARS AND PINIONS

BOSTON Gear Works, Norfolk Downs, Mass. (See page 185.)

CHICAGO Rawhide Mfg. Co., 1301 Elston Ave., Chicago, Ill.

CROFOOT Gear Works, Haverhill, Mass. (See page 191.)

FROST Gear & Forge Co., Jackson, Mich. (See page 187.)

GANSCHOW Co., Wm., 1001-05 Washington Blvd., Chicago, Ill. (See page 191.)

MEISEL Press Mfg. Co., 944-48 Dorchester Ave., Boston, Mass.

NEW England Gear Works, 100 Purchase St., Boston, Mass.

NEW Process Gear Corp., Syracuse, N. Y. (See page 201.)

NUTTALL Co., R. D., McCandless St. & Harrison Ave., Pittsburg, Pa.

PHILADELPHIA Gear Works, 1120 Vine St., Philadelphia, Pa.

SIER-BATH Co., 143 W. 54th St., New York, N. Y. (See page 437.)

SYRACUSE Rawhide Mfg. Co., Niagara & Shonnard Sts., Syracuse, N. Y.

VAN DORN & Dutton Co., Cleveland, O. (See page 443.)

WOBURN Gear Works, 32 Nashua St., Woburn, Mass.

SPECIAL DRIVING GEARS AND PINIONS

DETROIT Radiator & Specialty Co., 959 Woodward Ave., Detroit, Mich. (See page 437.)

GENERATORS

ACETYLENE GAS GENERATORS

(For Acetylene Tanks—See Tanks, Acetylene)

BADGER Brass Mfg. Co., Lyman Ave., Kenosha, Wis. "Solar."

BROWN Mfg. Co., John W., Columbus, O.

CHICAGO Auto Lamp Works, 900-04 W. Lake St., Chicago, Ill.

COLUMBIA—See Hine-Watt Mfg. Co.

CORCORAN Lamp Co., Reading Rd., Cincinnati, O.

DIETZ Co., R. E., 60 Laight St., New York, N. Y. "Handy."

EDMUNDS & Jones Mfg. Co., 432-52 Lawton Ave., Detroit, Mich. (See page 233.)

HAWTHORNE Mfg. Co., 38 Spruce St., Bridgeport, Conn. "Old Sol."

GRAY & Davis, Boston, Mass. (See page 159.)

HANDY—See Dietz Co.

HINE-WATT Mfg. Co., 180 N. Market St., Chicago, Ill. "Columbia."

HOFACKER Mfg. Co., 555 W. 42d St., New York, N. Y. (See page 235.)

NEVEROUT—See Rose Mfg. Co.

OLD SOL—See Hawthorne Mfg. Co.

ROSE Mfg. Co., 910 Arch St., Philadelphia, Pa. "Neverout."

SOLAR—See Badger Brass Mfg. Co.

Complete Index to Classification appears on Pages 8 to 26.

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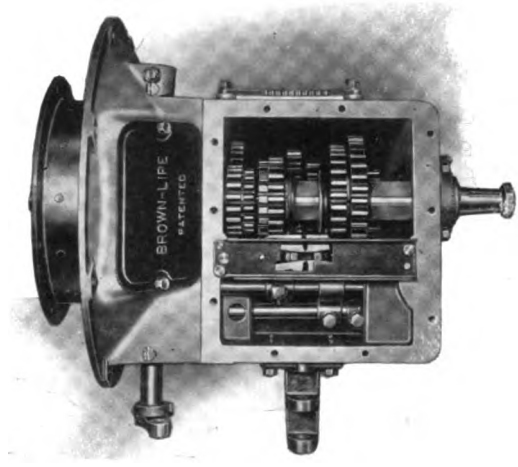

BROWN-LIPE TRANSMISSIONS DIFFERENTIALS

BROWN-LIPE quality is the direct result of the most elaborate and exhaustive testing and inspecting system known to modern manufacturing methods.

This does not apply alone to the chemical and physical tests of the raw material used. For in the manufacturing processes the machining limits are microscopical. And faithful adherence to those limits is compelled by most positive checking and inspection after each operation, that prevents even minor variations in any preliminary step.

Quantity and faithful adherence to shipping promises of Brown-Lipe products are assured by the completeness and magnitude of the Brown-Lipe organization both as regards men and equipment.

BROWN-LIPE GEAR CO.

SYRACUSE
N. Y. U. S. A.

BROWN-LIPE-CHAPIN CO.

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GENERATORS (Continued)

ACETYLENE GAS GENERATORS (Continued)

SUPERIOR Lamp Mfg. Co., 136 W. 52d St., New York, N. Y.

TANK O' GAS Co., 25 Bramhall St., Portland, Me.

VICTOR Lamp Co., Colerain & Sassafras Sts., Cincinnati, O.

GLASS

POLISHED PLATE GLASS

HARRIS, Chas. H., 142-46 W. 24th St., New York, N. Y.

SMITH, Thos. J. D., 65-71 Chambers St., Newark, N. J.

WIRE GLASS

(For use in Glass Fronts and Wind Shields)

MISSISSIPPI Wire Glass Co., 220 Fifth Ave., New York, N. Y.

GLASSES

GAUGE AND LUBRICATOR GLASSES

BACHE & Co., Semon, West & Hubert Sts., New York, N. Y.

LIPPINCOTT Glass Co., Miles Greenwood Bldg., Cincinnati, O.

MONCRIEFF—See Rogers Co.

PERTH—See Rogers Co.

ROGERS Co., H. A., 87 Walker St., New York N. Y. (Importers.) "Moncrieff," "Unific," "Perth."

UNIFIC—See Rogers Co.

GLOVES

ELECTRICALLY HEATED GLOVES

CARRON & Co., 75 Beekman St., New York, N. Y.

MOTORISTS GLOVES AND GAUNTLETS

ADIRONDACK—See Spear-Martin Fur Co.

ALLEN & Sons, John C., Gloversville, N. Y.

AMERICAN Buffalo Robe Co., 1-7 Howell St., Buffalo, N. Y.

AMERICAN Glove Co., 2013 Churchill St., Chicago, Ill.

BISHOP Co., J. H., Wyandotte, Mich.

BLACK GHOST—See Heagle, James.

BRADFORD, R. E., 51 E. Fulton St., Gloversville, N. Y.

CROSBY-FRISIAN Fur Co., 571 Lyell Ave., Rochester, N. Y.

EISENDRATH Glove Co., Armitage & Elston Aves., Chicago, Ill.

ELLSWORTH & Thayer Mfg. Co., 336-40 Broadway, Milwaukee, Wis. "Kantryp."

FRIED, Ostermann, Meyer Co., 617 Reed St., Milwaukee, Wis. "Price."

GLOVERSVILLE Auto Glove Co., 42 Grand St., Gloversville, N. Y. "M. W. M."

GRINNELL—See Morrison-Ricker Mfg. Co.

GRIP-TITE—See Morrison-Ricker Mfg. Co.

HANSEN Mfg. Co., O. C., Detroit & Milwaukee Sts., Milwaukee, Wis.

HEAGLE, James, First Ave. & Market St., Johnstown, N. Y. "Black Ghost."

KANTRYP—See Ellsworth & Thayer Mfg. Co.

LA CROSSE Knitting Mills, La Crosse, Wis.

LUTHER Glove Co., J. P., Berlin, Wis. "Red Ball."

M. W. M.—See Gloversville Auto Glove Co.

MORAWETZ Co., 217-25 E. Water St., Milwaukee, Wis.

MORRISON-RICKER Mfg. Co., 72 Broad St., Grinnell, Ia. "Grinnell," "Rist-Fit." "Grip-Tite."
(See page 539.)

NORTHROP—See Syracuse & Eldridge Glove & Legging Co.

PONTIAC Knitting Co., Pontiac, Mich.

PRICE—See Fried, Ostermann, Meyer Co.

RED BALL—See Luther Glove Co.

RIPON Knitting Works, Ripon, Wis.

RIST-FIT—See Morrison-Ricker Mfg. Co.

SINCLAIR Glove Co., 1307 S. Union St., Los Angeles, Cal.

SPEAR-MARTIN Fur Co., 41 Church St., Burlington, Vt. "Adirondack."

SYRACUSE & Eldridge Glove & Legging Co., 1020 S. Salina St., Syracuse, N. Y. "Northrop."

WALLACE Co., Hugh, 2626 E. Grand Boulevard, Detroit, Mich.

GOGGLES

MOTORISTS GOGGLES AND EYE SHIELDS

ADAMS, William C., 332 Boylston St., Boston, Mass.
(See page 501.)

ALBEX—See Willson & Co.

AMERICAN Thermo Ware Co., 16 Warren St., New York, N. Y. (Importers.) "Autocrat."

AUTOCRAT—See American Thermo Ware Co.

AUTOGLAS—See Hardy Co.

BOSTON—See Chicago Eye Shield Co.

CHEYENNE—See Chicago Eye Shield Co.

CHICAGO Eye Shield Co., 128 S. Clinton St., Chicago, Ill. "Boston," "Rex," "Panama," "Cheyenne."

COOKS—See Iowa Optical Co.

DIMMER Goggle Co., Whiting, Ind.

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CROFOOT GEARS

A Quality Product

We specialize on small and medium sizes for HIGH GRADE MOTORS. Throttle and Spark, Rod and Lever Gears. Commutator and Cam Shaft; Timer, Fan, Oiler and Pump Gears. Does Real Service in every detail appeal to you? Then enter our growing list of satisfied customers.

ALWAYS READY TO QUOTE PROMPTLY.

CROFOOT GEAR WORKS, Haverhill, Mass.

See April issue for location of our new factory

In position to take on medium sized contracts of several high class Automobile Builders

GENERATED BEVEL GEARS

For Rear Axles or Differentials

SPUR GEARS

For Transmissions

WM. GANSCHOW COMPANY

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GOGGLES (Continued)

MOTORISTS GOGGLES AND EYE SHIELDS (Continued)

EFF & SEE—See Frank & Co., Arthur.

ESSEX Rubber Co., Trenton, N. J.

FRANK & Co., Arthur, 71-73 Nassau St., New York, N. Y. "Eff & See."

FRIEDLANDER & Bro., Joseph, 8 Maiden Lane, New York, N. Y.

GENERAL Optical Co., 538-40 First Ave., New York, N. Y. "Gogglette."

GLOBE Optical Co., 403 Washington St., Boston, Mass.

GOGGLETTE—See General Optical Co.

HARDY Co., F. A., Chicago, Ill. "Autoglas."

IOWA Optical Co., New London, Ia. "Cooks."

KING Optical Co., F. W., Ellastone Bldg., Cleveland, O.

KING Optical Co., Julius, 10-12 Maiden Lane, New York, N. Y.

LEASURE Eye & Nose Shield Co., 4 Sanford St., Bradford, Pa.

LLOYD Co., Andrew J., 315 Washington St., Boston, Mass. (Importers.)

NON-STRAIN—See Opthalmuscope Co.

OPTHALMUSCOPE Co., 437 Dorr St., Toledo, O. "Non-Strain."

PANAMA—See Chicago Eye Shield Co.

REX—See Chicago Eye Shield Co.

SPENCER Optical Co., 5-7 Maiden Lane, New York, N. Y.

STANDARD Optical Co., Geneva, N. Y.

SUSSFELD, Lorsch & Co., 90 Maiden Lane, New York, N. Y.

WHITE-HAINES Optical Co., Columbus, O.

WILLSON & Co., T. A., Reading, Pa. "Albex."

YATMAN Rubber Co., 267-69 Mt. Pleasant Ave., Newark, N. J.

GONGS

MECHANICAL GONGS

(See Bells, Mechanical)

GOVERNORS

GASOLINE ENGINE GOVERNORS

(For keeping the Speed of a Car below Predetermined Limits)

KRAMER Governor Co., Detroit, Mich.

PIERCE Speed Controller Co., Anderson, Ind.

STEELE, W. M., 98 Beacon St., Worcester, Mass.

GRAPHITE

LUBRICATING GRAPHITE

(For Graphite Grease—See Lubricants)

CHESTER Graphite Co., Chester Springs, Pa.

DIXON Crucible Co., Joseph, Jersey City, N. J.
(See page 195.)

INTERNATIONAL Acheson Graphite Co., Niagara Falls, N. Y.

UNITED States Graphite Co., Saginaw, Mich.

WISCONSIN Graphite Co., Stevens Point, Wis.

GREASES

CUP AND GEAR GREASES

ACHESON Oildag Co., Port Huron, Mich. "Gredag."

ADAMS Grease & Oil Co., 161 W. 51st St., New York, N. Y.

ADMISCO—See Millers Sons Co.

ADVANCE Oil Works, 310-12 Flushing Ave., Brooklyn, N. Y.

AJAX Oil & Grease Co., 170 W. 65th St., New York, N. Y.

ALBANY Lubricating Co., 708-10 Washington St., New York, N. Y. "Cooks."

ALEXANDER & Co., H. T., 17 Battery Pl., New York, N. Y. "Grand Prix."

AMALIE—See Sonneborn Sons.

AMERICAN—See Miller Co.

AMERICAN Oil Co., Jackson, Mich. "Amoco," "Gearo."

AMOCO—See American Oil Co.

ARCO—See Atlantic Refining Co.

ARGO—See Van Tilburg Oil Co.

ATLANTIC Refining Co., Euclid Ave. & E. 65th St., Cleveland, O. "Arco."

ATLAS—See Swan & Finch Co.

AURORA—See Pigot-Sayre Co.

AUTO Oil Co., 172 S. Water St., Jackson, Mich. "Diamond Cross."

AUTOGREASE—See Ilsley, Doubleday & Co.

BADGER—See Wadhams Oil Co.

BAKER, Wm. T., 220-32 Suydam Ave., Jersey City, N. J. "Safeguard."

BALKAN—See Jones & Bro., J.

BANNER—See Clarkson & Ford Co.

BAUM'S Castorine Co., 104 N. George St., Rome, N. Y.

BELL Oil Co., 53 E. Ferry St., St. Louis, Mo. "Liberty Bell."

BESLY & Co., Charles H., 118-24 N. Clinton St., Chicago, Ill. "Helmet."

BISON—See Cataract Refining & Mfg. Co.

BLACK DIAMOND—See Sweet, Charles F.

BLIVEN & Carrington, 125 Broad St., New York, N. Y. "E. Z. Way."

BORNE, Scrymser Co., 80 South St., New York, N. Y. "Colonial," "Silex."

BUCK & Co., E. A., Worcester, Mass.

BURKO Grease Co., 3821 Baring St., Philadelphia, Pa.

CALYPSOL—See Cataract Refining & Mfg. Co.

CAROLENE—See Valley Oil Co.

CASCADE—See Cataract Refining & Mfg. Co.

CASSCO Bar-Metallic Packing Co., 8 S. Dearborn St., Chicago, Ill.

CATARACT Refining & Mfg. Co., Marine National Bank Bldg., Buffalo, N. Y. "Bison," "Calypsol," "Cascade."

CHAINOLENE Mfg. Co., Phipps Power Bldg., Pittsburgh, Pa.

CHESTER Graphite Co., Chester Springs, Pa. "Hexagon."

CINCINNATI Oil Works Co., Cincinnati, O.

CLARKSON & Ford Co., 55 Water St., New York, N. Y. "Banner."

CLIMAX—See Sweet, Charles F.

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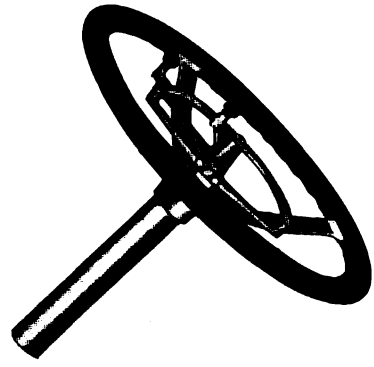
"Safety First"

Jacox

Steering Gears



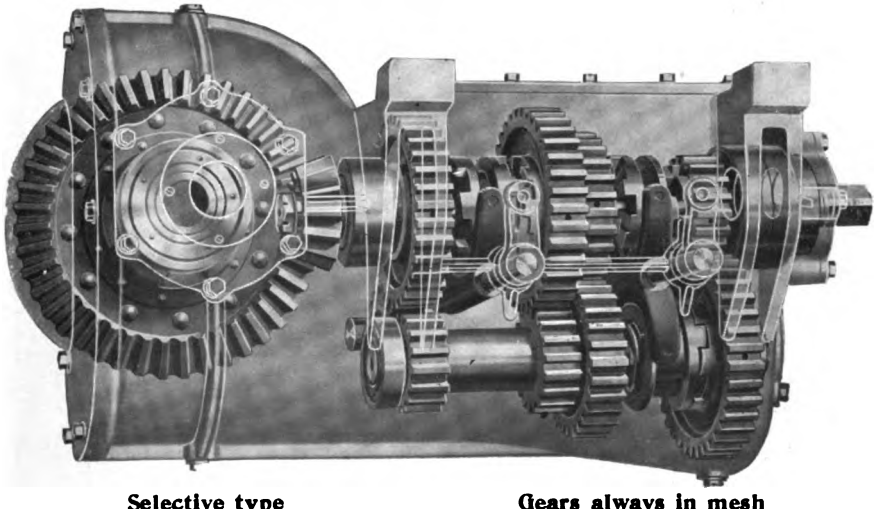
Standard
Strength
and
Service

We Will Build 150,000 Steering Gears for 1915 Cars.

They Must Be Right.

Jackson-Church-Wilcox Co.
Saginaw, W. S. Michigan
U. S. A.

COTTA TRANSMISSIONS
ONE TO TEN TONS CAPACITY
FOR
TRUCKS and TRACTORS



Selective type Gears always in mesh
No Plain Bearings—Mainshaft gears mounted on Roller bearings

COTTA TRANSMISSION CO.
814 South Main Street Rockford, Illinois

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GREASES (Continued)

CUP AND GEAR GREASES (Continued)

COLONIAL—See Borne, Scrymser Co.

COLUMBIA Refining Co., 90 West St., New York, N. Y. " K. A. C."

CONNECTICUT Oil Co., 549 S. Leonard St., Waterbury, Conn.

CONTINENTAL Asbestos Corp., 7-11 Summer St., Worcester, Mass. "Spedolene."

CONTINENTAL Oil Products Co., 1467 Michigan Ave., Chicago, Ill.

COOKS—See Albany Lubricating Co.

CRANE & Co., 91 Oliver St., Boston, Mass. "Eureka."

CRAWFORD Co., Wm. J., 14 Wood St., Pittsburg, Pa.

CROWN—See Kellogg & Co.

DETROIT—See Zurn Co.

DIAMOND CROSS—See Auto Oil Co.

DIXON Crucible Co., Joseph, Jersey City, N. J.
(See page 195.)

DRAKE Oil Co., 99 E. Spring St., Titusville, Pa.

DUPLEX—See Enterprise Oil Co.

E. Z. WAY—See Bliven & Carrington.

EAGLE Oil & Supply Co., Boston, Mass. "Eagleine."
(See page 277.)

EAGLEINE—See Eagle Oil & Supply Co.

EBONITE—See Oil City Oil & Grease Co.

ECONOMY—See Pennsylvania Lubricating Co.

EMCO—See Emery Mfg. Co.

EMERY Mfg. Co., Bradford, Pa. "Emco."

EMPIRE—See Richardson Lubricating Co.

ENERGINE Refining & Mfg. Co., The Arcade, Cleveland, O.

ENSIGN Refining Co., 10605 Quebec Ave., Cleveland, O.

ENTERPRISE Oil Co., 164 Chandler St., Buffalo, N. Y. "Duplex."

EUREKA—See Crane & Co.

EXCELSIOR—See Kellogg & Co.

EXCELSIOR—See Miller's Sons.

EXCELSIOR—See Mills Oil Co.

FAULTLESS—See Hawkeye Oil Co.

FIBROVISCOS—See Sheppard, W. S.

FISKE Bros. Refining Co., 24 State St., New York, N. Y. "Lubroleine."

FRANK Oil Co., 23 W. Spring St., Titusville, Pa.

FRANKLIN Oil Works, E. Atlantic Ave., Franklin, Pa.

FRAZER Lubricator Co., 3921 Normal Ave., Chicago, Ill.

FULCRUM Oil Co., Franklin, Pa.

GEARO—See American Oil Co.

GERMANIC—See Wood Co.

GOLD MEDAL—See Monarch Mfg. Co.

GRAND PRIX—See Alexander & Co.

GREAT Western Oil Co., 2855 E. 37th St., Cleveland, O.

GREDAG—See Acheson Oildag Co.

GREE-NO-CO—See Greenslade Oil Co.

GREENSLADE Oil Co., 40 Jefferson Ave., Detroit, Mich. "Gree-no-co."

GREOIL—See Robinson & Son Co.

HAGGERTY Refining Co., 50 South St., New York, N. Y. "Thermo."

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

HARRIS Oil Co., A. W., 326 S. Water St., Providence, R. I.

HARRIS & Co., Elmer E., 2 Maurice St., Buffalo, N. Y.

HARRISON Agalite Lubricating Co., Syracuse, N. Y.

HAVOLINE—See Indian Refining Co.

HAWKEYE Oil Co., Waterloo, Ia. "Faultless."

HAWS, George A., 142-44 Front St., New York, N. Y. "Panhard."
(See page 277.)

HELMET—See Besly & Co.

HEXAGON—See Chester Graphite Co.

HIGH Grade Oil Refining Co., 68 Broad St., New York, N. Y. "Hygrade."

HOLLINGSHEAD Co., R. M., Camden, N. J. "Whiz."

HOUGHTON & Co., E. F., 240 W. Somerset St., Philadelphia, Pa.

HYGRADE—See High Grade Oil Refining Co.

IDEAL—See Sheppard, W. S.

ILSLEY, Doubleday & Co., 229-31 Front St., New York, N. Y. "Autogrease."

IMPERIAL Oil Co., 3124 Locust St., St. Louis, Mo.

INDIAN Refining Co., 17 Battery Pl., New York, N. Y. "Havoline."

INTERSTATE Chemical Co., 12-20 Bayview Ave., Jersey City, N. J.

INVADER Oil Co., 80 Broad St., New York, N. Y.

JONES & Bro., J., 429 Locust St., Philadelphia, Pa. "Balkan."

K. A. C.—See Columbia Refining Co.

KANTER Co., R. J., 647 Water St., New York, N. Y.

KELLOGG & Co., E. H., 242-44 South St., New York, N. Y. "Crown." "Excelsior."

KENDALL Refining Co., Bradford, Pa. "Royal."

KEYSTONE Lubricating Co., 1331 Race St., Philadelphia, Pa.

KILNOYS—See Miller Co.

LESOYL—See Lumen Bearing Co.

LIBERTY BELL—See Bell Oil Co.

LION—See Moore Oil Co.

LOOS & Dilworth, 134 S. Front St., Philadelphia, Pa. "Pioneer."

LUBROLEINE—See Fiske Bros. Refining Co.

LUMEN Bearing Co., Buffalo, N. Y. "Lesoyl."
(See pages 195 and 259.)

McLEAN-JONES Oil & Supply Co., 40 India Wharf, Boston, Mass. "Swastika."

MARATHON—See Weinberg & Co.

MARSHALL Oil Co., Marshalltown, Ia. "Moco," "Rex."

MICAFLAKE—See U. S. Mica Mfg. Co.

MILLER Co., Wm. P., 244-50 Green St., Brooklyn, N. Y. "American." "Kilnoys."

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Gear Bronzes

Data Based on Experience

(AVERAGE FIGURES)

PHOSPHOR BRONZE

	Sand Cast	Chill Cast
Tensile Strength	35000 lbs.	50000 lbs.
Elongation	8%	10%
Brinell Hardness	74	100

ALUMINUM BRONZE

	Sand Cast	Chill Cast
Tensile Strength	65000 lbs.	75000 lbs.
Elongation	26%	29%
Brinell Hardness	93	105

MANGANESE BRONZE

	Sand Cast	Chill Cast
Tensile Strength	76000 lbs.	84000 lbs.
Elongation	27%	29%
Brinell Hardness	109	124

"The Right Bronze Means Economy"

LUMEN BEARING COMPANY

BRASS FOUNDERS

BUFFALO, N. Y.

GREASE CUPS

Oilers, Hood Handles, Hood Catches, Floor Board Lifts, Metal Stampings, Castings, etc.

Grease Cups and Caps with Locking Devices.

Spring Bolt Caps in Brass and Steel, any finish desired.

The Burns & Bassick Co.
BRIDGEPORT, CONN.

Dixon's Graphite

Transmission and Differential

Grease No. 677

This special mixture is the only safe lubricant for the transmissions and differentials of cars and trucks because it is the only lubricant which actually identifies itself with the metal of the gears. The veneer of pure graphite built up on the metal substitutes anti-friction surfaces of oily graphite for the friction-creating metal surfaces. Wear is minimized, noise eliminated, and long life assured. Study the problem of lubrication and lubricants in Automobile Literature No. 35.

Made in JERSEY CITY, N. J., by the

Joseph Dixon Crucible Company
Established 1827

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GREASES (Continued)

CUP AND GEAR GREASES (Continued)

MILLER'S Sons, Wm. P., 298-302 Hancock St., Long Island City, N. Y. "Excelsior."

MILLERS Sons Co., A. D., 3300 Grand Blvd., Pittsburg, Pa. "Perfection," "Admisco."

MILLS Oil Co., C. E., 263 Walton St., Syracuse, N. Y. "Excelsior."

MOCO—See Marshall Oil Co.

MONARCH Mfg. Co., Council Bluffs, Iowa. "Gold Medal."

MONOGRAM—See New York Lubricating Oil Co.

MOORE Oil Co., York St. & McLean Ave., Cincinnati, O. "Lion."

MOTORLIGHT—See Petroleum Coke Co.

MOTORLUBE—See Tygert Co.

NAPOLEON—See Van Tilburg Oil Co.

NATIONAL Refining Co., Rose Bldg., Cleveland, O.

NATIONAL Oil & Supply Co., 180 Freylinghuysen Ave., Newark, N. J. "Viscos."

NEW York Lubricating Oil Co., 116 Broad St., New York, N. Y. "Monogram."
(See page 633.)

NEW York & New Jersey Lubricant Co., 165 Broadway, New York, N. Y. "Non-Fluid."

NOBETR—See Sawyer Oil Co.

NON-FLUID—See New York & New Jersey Lubricant Co.

NORTHWESTERN Chemical Co., Marietta, O.
(See page 131.)

OIL City Oil & Grease Co., 365-77 Seneca St., Oil City, Pa. "Pensoil," "Ebonite."

OIL Products Co., 17 Battery Pl., New York, N. Y. "Usoline."

OILZUM—See White & Bagley Co.

ORIENTAL—See Reliance Oil & Grease Co.

OTTOMO—See Pioneer Mfg. Co.

OWL—See Western Chemical Mfg. Co.

PALUBCO—See Pennsylvania Lubricating Co.

PANAMA Oil & Grease Co., 159-61 W. 51st St., New York, N. Y.

PANHARD—See Haws, Geo. A.

PARAGON Refining Co., Front St., Toledo, O. "Polar."

PATTERSON Lubricating Co., 114 Broad St., Boston, Mass.

PENN—See Pennsylvania Lubricating Co.

PENN Oil & Supply Co., Chicago, Ill.

PENN Petroleum Co., 115-17 N. Second St., Philadelphia, Pa. "Primus."

PENNSYLVANIA Lubricating Co., 34th St. & A. V. Ry., Pittsburg, Pa. "Penn," "Sylvan," "Economy," "Palubco."

PENSOIL—See Oil City Oil & Grease Co.

PERFECTION—See Millers Sons Co.

PERFECTION—See Sawyer Oil Co.

PERFECTION—See Wood Co.

PERFECTO—See Young & Kimball.

PERRY Oil Co., 372 Central Ave., Pawtucket, R. I.

PETROLEUM Coke Co., Edgemont & Venango Sts., Philadelphia, Pa. "Motorlight."

PETROLEUM Products Co., 3600-10 Grant Blvd., Pittsburg, Pa. "Sound Proof."

PHILADELPHIA Grease Mfg. Co., 848-50 S. Swanson St., Philadelphia, Pa.

PIGOT-SAYRE Co., 71-72 Front St., New York, N. Y. "Aurora."

PIONEER—See Loos & Dilworth.

PIONEER Mfg. Co., 5220 Sweeney Ave., S. E., Cleveland, O. "Ottomo."

PIONEER Oil Co., Old South Bldg., Boston, Mass.

PLATT & Washburn Refining Co., 15 Broadway, New York, N. Y. "Veedol."
(See page 279.)

POLAR—See Paragon Refining Co.

POLARINE—See Standard Oil Co. of N. Y.

PRIMUS—See Penn Petroleum Co.

PURE Oil Co., First St. & 13th Ave., S., Minneapolis, Minn. "Puritan."

PURITAN—See Pure Oil Co.

PURITAN Oil Co., 1218 W. 70th St., Cleveland, O.

RELIANCE Oil & Grease Co., 1521 Columbus Rd., Cleveland, O. "Oriental."

REX—See Marshall Oil Co.

RICHARDSON Lubricating Co., Quincy, Ill. "Empire."

ROBINSON & Son Co., Wm. C., 32 South St., Baltimore, Md. "Greoil."

ROYAL—See Kendall Refining Co.

SAFEGUARD—See Baker, Wm. T.

SAWYER Oil Co., Howard B., 65 Long Wharf, Boston, Mass. "Nobetr," "Perfection."

SHEPPARD, W. S., 21 Lawrence St., Newark, N. J. "Fibroviscos," "Ideal."

SILEX—See Borne, Scrymser Co.

SONNEBORN Sons, L., Fulton & Pearl Sts., New York, N. Y. "Amalie."

SOUND PROOF—See Petroleum Products Co.

SPEARE'S Sons Co., Alden, 140 Sixth St., Boston, Mass.

SPEDOLENE—See Continental Asbestos Corp.

STANDARD Oil Co. of N. Y., New York, N. Y. "Polarine."

STAR Oil Co., 440-42 N. Halsted St., Chicago, Ill.

SULLIVAN Oil Co., 413 Wells St., Chicago, Ill.

SUPERIOR Oil Co., Century Bldg., Cleveland, O.

SUTHERLAND & Co., P., 232 Milk St., Boston, Mass. "Velvet."

SWAN & Co., Alden S., 135 Front St., New York, N. Y. "Swanovia."

SWAN & Finch Co., 151 Maiden Lane, New York, N. Y. "Atlas."

SWANOVIA—See Swan & Co.

SWASTIKA—See McLean-Jones Oil & Supply Co.

SWEET, Charles F., 247 State St., Hartford, Conn. "Climax," "Black Diamond."

SYLVAN—See Pennsylvania Lubricating Co.

TEXACO—See Texas Co.

TEXAS Co., 17 Battery Pl., New York, N. Y. "Texaco."

Complete Index to Classification appears on Pages 8 to 26.

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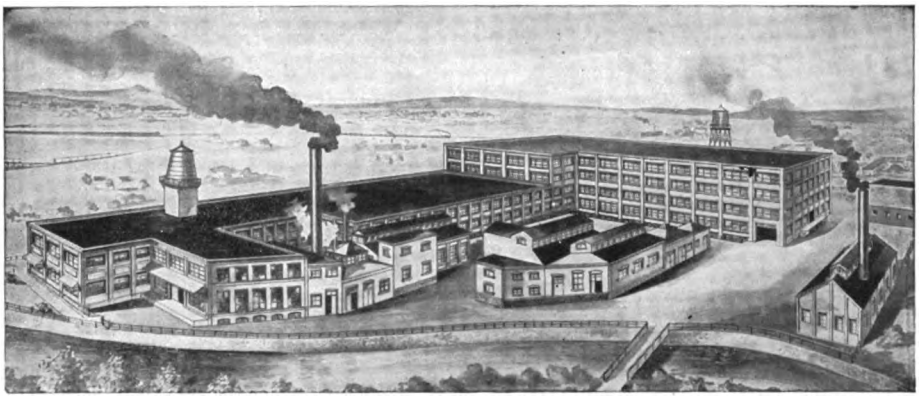

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CUP AND GEAR GREASES (Continued)

THERMO—See Haggerty Refining Co.

TOCO—See Tropical Oil Co.

TROJAN—See Van Tilburg Oil Co.

TROPICAL Oil Co., W. 70th St. & L. S. & M. S. Ry., Cleveland, O. "Toco."

TULC—See Universal Lubricating Co.

TYGERT Co., E. A., 126 N. Front St., Philadelphia, Pa. "Motorlube."

UNION Petroleum Co., 135 S. Second St., Philadelphia, Pa.

U. S. Mica Mfg. Co., Lytton Bldg., Chicago, Ill. "Micaflake."

UNITED States Graphite Co., Saginaw, Mich.

UNIVERSAL—See Young & Kimball.

UNIVERSAL Lubricating Co., Schofield Bldg., Cleveland, O. "Tulc."

USOLINE—See Oil Products Co.

VACUUM Oil Co., Rochester, N. Y.

VALLEY Oil Co., Century Bldg., Cleveland, O. "Carolene."

VALVOLINE Oil Co., 11 Broadway, New York, N. Y.

VAN NOSTRAND Mfg. Co., 136 Liberty St., New York, N. Y. "White Circle."

VAN TILBURG Oil Co., 2424-28 University Ave., S. E., Minneapolis, Minn. "Napoleon," "Argo," "Trojan."

VEEDOL—See Platt & Washburn Refining Co.

VELVET—See Sutherland & Co.

VERACITY—See Warren Refining Co.

VISCO Motor Oil Co., 2104 Superior Viaduct, Cleveland, O.

VISCOS—See National Oil & Supply Co.

VISCOSITY Oil Co., 1101-03 W. 37th St., Chicago, Ill.

WADHAMS Oil Co., Milwaukee, Wis. "Badger."

WARREN Refining Co., 1137 W. 11th St., Cleveland, O. "Veracity."

WEINBERG & Co., J. H., 128 Maiden Lane, New York, N. Y. "Marathon."

WESTERN Chemical Mfg. Co., 151 Sixth St., Milwaukee, Wis. "Owl."

WHITE CIRCLE—See Van Nostrand Mfg. Co.

WHITE & Bagley Co., Worcester, Mass. "Oilzum." (See Back Cover.)

WHITMORE Mfg. Co., 33 Iron Ct., Cleveland, O.

WHIZ—See Hollingshead Co.

WONDER WORKER—See Hall-Thompson Co.

WOOD Co., W. A., 373 Atlantic Ave., Boston, Mass. "Perfection," "Germanic."

YOUNG, Orlando W., 277 Halsey St., Newark, N. J.

YOUNG & Kimball, Frank L., 111 Purchase St., Boston, Mass. "Universal." "Perfecto."

ZURN Co., O. F., 2736-38 N. Broad St., Philadelphia, Pa. "Detroit."

GRIPS

LEVER HANDLE GRIPS

GOODYEAR Tire & Rubber Co., Akron, O.

PEDAL GRIPS

AUTO Pedal Pad Co., 794 Seventh Ave., New York, N. Y. "Perfection."

PERFECTION—See Auto Pedal Pad Co.

SIDWELL Pedal Mat Co., 245 Columbus Ave., Boston, Mass.

THROTTLE AND SPARK LEVER GRIPS

AMERICAN Hard Rubber Co., 9 Mercer St., New York, N. Y.

CONDENSITE Co. of America, Belleville Ave., Glen Ridge, N. J.

LUZERNE Rubber Co., Trenton, N. J.

STOKES Rubber Co., Jos., Trenton, N. J.

GUARDS

HORN BULB GUARDS

ASCO—See N. Y. Wire & Spring Co.

N. Y. Wire & Spring Co., 586-88 Washington St., New York, N. Y. "Asco." (See page 395.)

LEATHER MUD GUARDS AND FENDERS

McKINNON Dash Co., 252 Amherst St., Buffalo, N. Y.

PETERS-HERRON Dash Co., Gift & Culbertson Sts., Columbus, O.

METAL MUD GUARDS AND FENDERS

A-Z Co., 530 W. 56th St., New York, N. Y.

AUTO Metal Co., 520 Worthington St., Springfield, Mass.

BRISCOE Mfg. Co., Woodward & Baltimore Aves., Detroit, Mich. (See page 331.)

BRISKIN Mfg. Co., 539 N. Capitol Ave., Indianapolis, Ind.

BUNN-HUTCHINSON Co., 2074 E. 22d St., Cleveland, O.

BUSH Mfg. Co., Hartford, Conn. (See page 207.)

COLUMBUS Auto Brass Co., 767 N. Fourth St., Columbus, O.

DETROIT Auto Specialty Co., 909-11 Greenwood Ave., Detroit, Mich.

EUREKA Auto Parts Co., 1915 Pine St., St. Louis, Mo.

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FRANKLIN Machine Co., 770 Franklin Ave., Brooklyn, N. Y.

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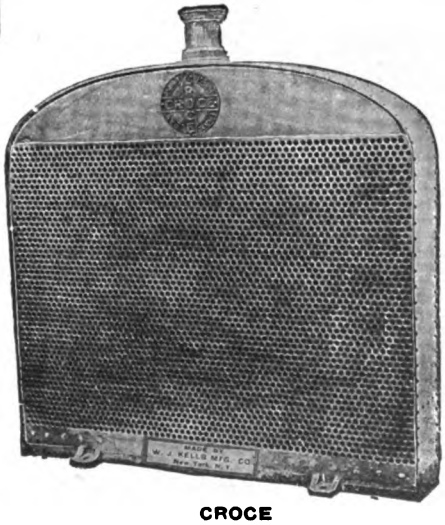

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GUARDS (Continued)

METAL MUD GUARDS AND FENDERS (Continued)

HEARD Mfg. Co., 1318 S. Main St., Los Angeles, Cal.

IDEAL Sheet Metal Works, 2809 Michigan Ave., Chicago, Ill.
(See page 331.)

ILLINOIS Auto Sheet Metal Works, 58-60 E. 16th St., Chicago, Ill.

JOHNSON'S Automobile Sheet Metal Works, W. N., 620-28 South J St., Richmond, Ind.

KELLS Mfg. Co., W. J., 521-25 W. 45th St., New York, N. Y.
(See page 203.)

KEYSTONE Sheet Metal Co., Ambridge, Pa.

KINSEY Mfg. Co., Toledo, O.

LAWSON Co., F. H., Cincinnati, O.

METAL Auto Parts Co., Industrial Bldg., Indianapolis, Ind.

MICHIGAN Stamping Co., 759-71 Bellevue Ave., Detroit, Mich.

MOLINE Pressed Steel Co., East Moline, Ill.

MULLINS Co., W. H., 132 Franklin St., Salem, O.

PARAGON Auto-Parts Mfg. Co., 506 W. 53d St., New York, N. Y.

PERFEX Radiator Co., Racine, Wis.

REID Co., 1504 Third Ave., Moline, Ill.

SAGINAW Sheet Metal Works, Saginaw, Mich.

SARGEANT Mfg. Co., New & Summit Sts., Newark, N. J.

SPRINGFIELD Metal Body Co., Springfield, Mass.
(See page 69.)

SUSSMAN & Rosenberg Mfg. Co., M., Tarrytown, N. Y.

TODD Mfg. Co., 820-24 Mary Pl., Minneapolis, Minn.

WISCONSIN Automobile Radiator Co., North Milwaukee, Wis.

WOOD MUD GUARDS AND FENDERS

AMERICAN Veneer Co., 1501 Clinton St., Hoboken, N. J.

DANN Bros. & Co., 80-88 Franklin St., New Haven, Conn.

GUNS

GREASE GUNS

AGNER Co., Raymond C., Burlington, Wis. "Simplex."

B-LINE—See Randall-Faichney Co.

BECKLEY-RALSTON Co., Michigan Ave. & Randolph St., Chicago, Ill. "Maximus."

BIG DANE—See Miller & Starr Co.

BIGSBY-ROTARY Mfg. Co., 7500 Quincy Ave., Cleveland, O.
(See pages 205 and 305.)

BROWN Co., 213 Bellevue Ave., Syracuse, N. Y.

COX Brass Mfg. Co., Albany, N. Y.
(See page 357.)

ELMAR Mfg. Co., Alameda, Cal. "Freeman."

ESSEX Brass Co., G. B., 480-86 Franklin St., Detroit, Mich.

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill.

FREEMAN—See Elmar Mfg. Co.

GLEASON-PETERS Air Pump Co., 255-61 Classon Ave., Brooklyn, N. Y.

HANCOCK Mfg. Co., 770 Henry St., Charlotte, Mich.

HAYES Grease Gun Co., 231 Mulberry St., Newark, N. J.

HIPWELL Mfg. Co., 831-35 North Ave., W., Pittsburg, Pa.

INTERNATIONAL Automobile Supply Co., 117 W. South Water St., Chicago, Ill.

JUDD & Leland Mfg. Co., Clifton Springs, N. Y. "Victor."
(See pages 205 and 479.)

KELLOGG Mfg. Co., Rochester, N. Y.
(See page 325.)

LACO—See Lubricating Accessories Co.

LITTLE GIANT—See Neiman Machine Wks.

LUBRICATING Accessories Co., 82 Court St., Paterson, N. J. "Laco."

MAXIMUS—See Beckley-Ralston Co.

MILLER & Starr Co., 250 Green St., Brooklyn, N. Y. "Big Dane."

NEIMAN Machine Works, Freeport, Ill. "Little Giant."

NOERA Mfg. Co., Waterbury, Conn.

RANDALL-FAICHNEY Co., Boston, Mass. "B-Line."

RUNYON Mfg. Co., Greenville, Mich.

SANFORD Mfg. Co., F. C., Bridgeport, Conn.
(See page 511.)

SIMPLEX—See Agner Co.

SUNDERLAND Mfg. Co., 61 E. 24th St., Chicago, Ill.

TOWNSEND & Co., S. P., Orange, N. J.

VICTOR—See Judd & Leland Mfg. Co.

WILSON Instrument & Specialty Co., South & Second Sts., Passaic, N. J. "Wisco."

WISCO—See Wilson Instrument & Specialty Co.

OIL GUNS

AGNER Co., Raymond C., Burlington, Wis. "Simplex."

B-LINE—See Randall-Faichney Co.

BELL Pump & Mfg. Co., Detroit, Mich.
(See page 633.)

BLUE Ribbon Mfg. Co., 27 Baldwin St. (Charlestown), Boston, Mass. "Premium."

CODMAN & Shurtleff, 120 Boylston St., Boston, Mass.

COPLEY—See Randall-Faichney Co.

COX Brass Mfg. Co., Albany, N. Y.
(See page 357.)

ESSEX Brass Co., G. B., 480-86 Franklin St., Detroit, Mich.

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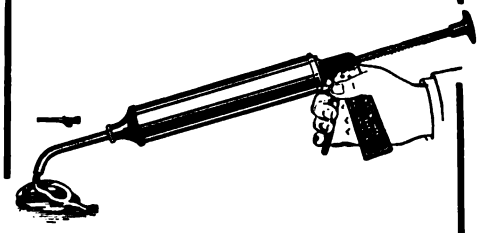

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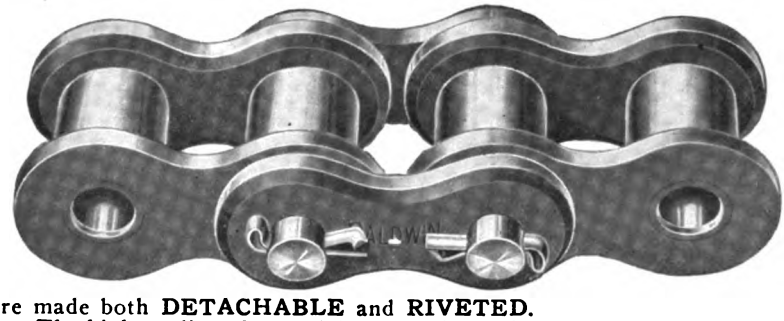

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Neustadt Automobile Supply Co., 3200 Locust St., St. Louis, Mo.
M. & M. Co., 501 High Ave., East, Cleveland, Ohio.
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OIL GUNS (Continued)

HANCOCK Mfg. Co., 770 Henry St., Charlotte, Mich.

JUDD & Leland Mfg. Co., Clifton Springs, N. Y.
(See pages 205 and 479.)

KELLOGG Mfg. Co., Rochester, N. Y.
(See page 325.)

LACO—See Lubricating Accessories Co.

LUBRICATING Accessories Co., 82 Court St., Paterson, N. J. "Laco."

NOERA Mfg. Co., Waterbury, Conn.

OSBORNE & Stephenson Mfg. Co., W. Main St., Plainville, Conn.
(See page 471.)

PREMIUM—See Blue Ribbon Mfg. Co.

RANDALL-FAICHNEY Co., Boston, Mass. "B-Line," "Copley."

SANFORD Mfg. Co., F. C., Bridgeport, Conn.
(See page 511.)

SIMPLEX—See Agner Co.

WILSON Instrument & Specialty Co., South & Second Sts., Passaic, N. J. "Wisco."

WISCO—See Wilson Instrument & Specialty Co.

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UPHOLSTERY HAIR

ARMOUR Curled Hair Works, 31st Pl. & Benson Sts., Chicago, Ill.

BENTLEY Hair Co., Joseph, Methuen, Mass.

DELANY & Co., 209 N. Third St., Philadelphia, Pa.

GORDON Bros., Pierce & Orthodox Sts. (Frankford), Philadelphia, Pa.

MITCHELL Co., P. R., Spring Grove & Harrison Aves., Cincinnati, O.

MORRIS & Co., U. S. Yards, Chicago, Ill.

SULZBERGER & Sons Co., Chicago, Ill.
(See page 207.)

WILKENS Co., Wm., Frederick Ave. & Wilkens St., Baltimore, Md.

WOLL & Co., F. P., Church & Tacony Sts. (Frankford), Philadelphia, Pa.

WOLL & Sons Mfg. Co., Peter, Hancock & Berks Sts., Philadelphia, Pa.

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(See also Trunks, Automobile)

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BURLINGTON Basket Works, 600 N. Main St., Burlington, Ia. "Hawkeye."

EASYPACK—See Bubeck & Guerin.

HAWKEYE—See Burlington Basket Works.

HEYWOOD Bros. & Wakefield Co., 174 Portland St., Boston, Mass.

SEITZ, C., 275 W. 128th St., New York, N. Y.

WAL-RIKE Pony Vehicle Co., St. Paris, O.

HANDLES

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AETNA Brass Mfg. Co., 3870-90 Hamilton Ave., Cleveland, O.

AMERICAN Brass Novelty Co., Grand Haven, Mich.

ATTWOOD Brass Works, Scribner Ave. & Bowery St., Grand Rapids, Mich.
(See page 249.)

BRAINERD Mfg. Co., East Rochester, N. Y.

BURNS & Bassick Co., Bridgeport, Conn.
(See page 195.)

COWLES & Co., C., New Haven, Conn.
(See page 87.)

DOUGLAS & Lomason Co., Detroit, Mich.
(See page 211.)

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

ENTERPRISE Brass & Plating Co., 2838-44 Spring Grove Ave., Cincinnati, O.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

JONAH & George, Merrimac, Mass.

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

LAW Engineering & Specialty Mfg. Co., Rochester, N. Y.

MERRIMAC Specialty Mfg. Co., Merrimac, Mass.

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y.
(See page 87.)

OCHSNER & Sons Co., A., 1060 State St., New Haven, Conn.

PHOENIX Lock Works, 321-27 Third Ave., Newark, N. J.

REGAN & Kirwin Mfg. Co., 37 Shattuck St., Lowell, Mass.

ROSTAND Mfg. Co., Milford, Conn.

SARGEANT Mfg. Co., New & Summit Sts., Newark, N. J.

SMITH & Co., Jos. N., Detroit, Mich.
(See page 547.)

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

WHITE Mfg. Co., 155 Cannon St., Bridgeport, Conn.

WIENER-BARNET Co., 312-28 Adams St., Newark, N. J.
(See page 249.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

STARTING CRANK HANDLES

AMERICAN Hard Rubber Co., 9 Mercer St., New York, N. Y.

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SULZBERGER'S
STERILIZED
CURLED HAIR
AUTOMOBILE UPHOLSTERY DE LUXE

FOR
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Sulzberger's Sterilized Curled Hair goes farthest.

It is properly seasoned before it is permitted to leave our factory. Offers maximum qualities of resiliency. Holds its curl and vitality permanently.

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BUSH MANUFACTURING CO
HARTFORD CONN.

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HANDLES (Continued)

STARTING CRANK HANDLES (Continued)

HELLENBERG Co., J. B., Jefferson & Clark Sts., Coldwater, Mich.

LUZERNE Rubber Co., Trenton, N. J.

MECHANICAL Rubber Co., C. P. & Nickel Plate R. R., Cleveland, O.

STOKES Rubber Co., Jos., Trenton, N. J.

HANGERS

HAT HANGERS

(Clip for hanging hats on robe rails—See also Racks, Hat)

BUCKEYE—See Central Brass & Fixture Co.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O. "Buckeye."

LICENSE HANGERS

(See Holders, License; also Numbers, License)

PRESSED STEEL STEP HANGERS

BOSSERT Co., Utica, N. Y. (See page 223.)

BUFFALO Pressed Steel Co., Military Rd. & Lansing St., Buffalo, N. Y.

CRANDAL, Stone & Co., Binghamton, N. Y. (See page 369.)

CROSBY Co., Buffalo, N. Y. (See page 157.)

DETROIT Pressed Steel Co., 1800 Mt. Elliott Ave., Detroit, Mich. (See page 555.)

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa. (See page 157.)

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O. (See page 81.)

HYDRAULIC Pressed Steel Co., 3164 E. 61st St., Cleveland, O. (See page 289.)

PARISH Mfg. Co., Reading, Pa. (See page 481.)

ROCHESTER Pressed Steel Co., 16 Commercial St., Rochester, N. Y.

HASSOCKS

AUTOMOBILE HASSOCKS

(For Metal Foot Rests—See Rests, Foot)

CHICAGO Hassock Co., 1731 S. State St., Chicago, Ill.

HEADLIGHTS

ACETYLENE HEADLIGHTS

(See Lamps, Acetylene)

ELECTRIC HEADLIGHTS

(See also Lamps, Electric)

ADAMS-BAGNALL Electric Co., Cleveland, O.

APELCO—See Apple Electric Co.

APPLE Electric Co., Newark, N. J. "Apelco."

E & J—See Edmunds & Jones Mfg. Co.

EDMUNDS & Jones Mfg. Co., 432-52 Lawton Ave., Detroit, Mich. "E & J." (See page 233.)

ESTERLINE Co., 228 E. South St., Indianapolis, Ind. "Golden Glow."

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill.

GOLDEN GLOW—See Esterline Co.

GUIDE Motor Lamp Mfg. Co., 11400 W. Madison Ave., Cleveland, O.

HALL Lamp Co., C. M., Rivard & Hancock Sts., Detroit, Mich.

HAMMER Co., E. A., 1839 Euclid Ave., Cleveland, O.

HOFACKER Mfg. Co., 555 W. 42d St., New York, N. Y. (See page 235.)

HEATERS

AUTOMOBILE HEATERS

(See also Gloves, Electrically Heated; also Wheels, Heated Steering)

AMERICAN Auto-Heater Co., 160 14th St., Buffalo, N. Y.

AMERICAN Electric Co., State & 64th Sts., Chicago, Ill.

AUTO Heater Co. of America, Horseheads, N. Y. "Four-in-One."

CHICAGO Flexible Shaft Co., 608 La Salle Ave., Chicago, Ill. "Duchess." "Clark."

CINCINNATI Auto Heater Mfg. Co., Liberty & Clay Sts., Cincinnati, O.

CLARK—See Chicago Flexible Shaft Co.

DETROIT Auto Heater Co., Detroit, Mich.

DUCHESS—See Chicago Flexible Shaft Co.

FOUR-IN-ONE—See Auto Heater Co. of America.

GAS Saver Sales Co., 1790 Broadway, New York, N. Y. "Harback."

HARBACK—See Gas Saver Sales Co.

K. P. Foot Rest Heater Co., 250 W. 54th St., New York, N. Y. (See page 209.)

LEHMAN Bros., 10 Bond St., New York, N. Y. "Queen." "Star."

LYTLE Auto Heater Co., Memphis, Tenn.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Radio." (See page 449.)

PEERLESS Radiator Co., Gibbs, Idaho.

QUEEN—See Lehman Bros.

RADIO—See Milwaukee Auto Specialty Co.

STAR—See Lehman Bros.

FEED WATER HEATERS

NATIONAL Pipe Bending Co., River & Lloyd Sts., New Haven, Conn.

OFELDT & Sons, F. W., Nyack, N. Y.

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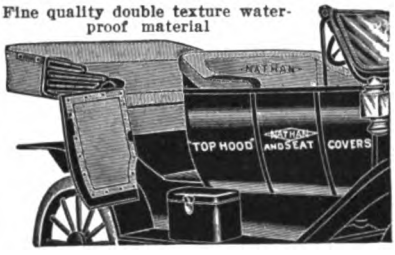

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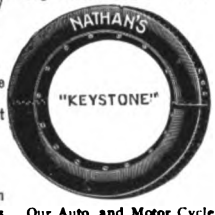
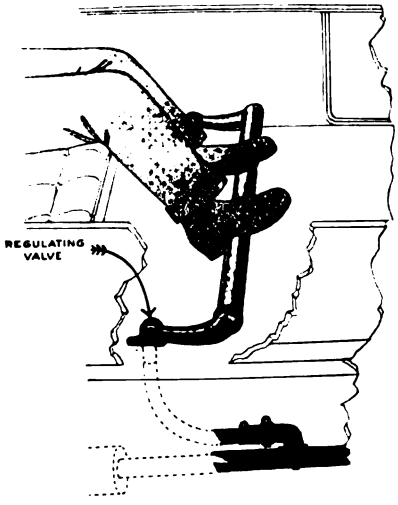


Here we show a few of our articles. Our Auto and Motor Cycle Catalogues (mailed on request) contain descriptions and prices of many others. Special quotations to Manufacturers, Jobbers and Dealers. Send for them.

Nathan Novelty Mfg. Co., 906 Reade St.
NEW YORK CITY, N. Y.



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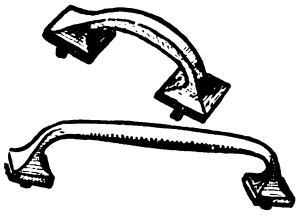

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Just what you need to replace your iron and brass nickel plated fittings. A solid white metal fitting, of which there is no nickel plate to wear off and no iron to rust. Just what you need to keep your car bright and new. Also get your nickel plated parts made of BENEDICT NICKEL and always have the sterling appearance of a new car. Write about these for prices to

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HEATERS (Continued)

MIXTURE HEATERS

(For heating mixture in Carbureter or Manifold to facilitate starting)

ARNOLD Electric Co., 93 Mass. Ave., Boston, Mass.

CRONE, F. G., 334 Genesee St., Buffalo, N. Y.

FORT Wayne Engineering & Mfg. Co., Fort Wayne, Ind. "Paul."

IECO—See Interstate Electric Co.

INDUS—See Industrial Electric Mfg. Co.

INDUSTRIAL Electric Mfg. Co., 139 Beaubien St., Detroit, Mich. "Indus."

INTERSTATE Electric Co., New Orleans, La. "Ieco."

NATIONAL Automobile Equipment Co., Industrial Bldg., Indianapolis, Ind.

PAUL—See Fort Wayne Engineering & Mfg. Co.

R. O. C. Sales Co., 1777 Broadway, New York, N. Y.

STAATS & Co., Geo., 252 Lorimer St., Brooklyn, N. Y. "Stalit."

STALIT—See Staats & Co.

TATE—See United Motor Equipment Co.

UNITED Motor Equipment Co., 2346 S. Michigan Ave., Chicago, Ill. "Tate."

VOLCANO Electric Primer Works, Virginia, Ill.

RADIATOR HEATERS

(For keeping radiators from freezing)

CONSOLIDATED Car Heating Co., Singer Bldg., New York, N. Y.

NEVEROUT—See Rose Mfg. Co.

ROSE Mfg. Co., 910 Arch St., Philadelphia, Pa. "Neverout."

WIGHT Mfg. Co., 512 Broadway, Toledo, O.

HINGES

CABINET HINGES

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

SARGENT & Co., Water & Wallace Sts., New Haven, Conn.

STANLEY Works, Dept. U., New Britain, Conn.
(See page 211.)

YALE & Towne Mfg. Co., 9 E. 40th St., New York, N. Y.

DOOR HINGES

AETNA Brass Mfg. Co., 3870-90 Hamilton Ave., Cleveland, O.

AMERICAN Brass Novelty Co., Grand Haven, Mich.

BRAINERD Mfg. Co., East Rochester, N. Y.

DOUGLAS & Lomason Co., Detroit, Mich.
(See page 211.)

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

EUREKA—See Parsons Mfg. Co.

GEM—See Parsons Mfg. Co.

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

MERRIMAC Hinge Co., Merrimac, Mass.

MONARCH—See Parsons Mfg. Co.

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y.
(See page 87.)

OCHSNER & Sons Co., A., 1060 State St., New Haven, Conn.

PARSONS Mfg. Co., 21st & Fort Sts., Detroit, Mich. "Gem," "Monarch," "Eureka."

SMITH & Co., Jos. N., Detroit, Mich.
(See page 547.)

SOSS Mfg. Co., 435-43 Atlantic Ave., Brooklyn, N. Y.

STANLEY Works, Dept. U., New Britain, Conn.
(See page 211.)

WAINWRIGHT & Son, W. W., 16th St. & Western Ave., Connersville, Ind.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

HOOD HINGES

A-Z Co., 530 W. 56th St., New York, N. Y.

BRONSON Co., Homer D., Beacon Falls, Conn.

HUNT & Dorman Mfg. Co., 2102-10 Superior Ave., N. E., Cleveland, O.

KINSEY Mfg. Co., Toledo, O.

SMITH & Co., Jos. N., Detroit, Mich.
(See page 547.)

WATERBURY Brass Goods Corp., 160 Washington Ave., Waterbury, Conn.

WIENER-BARNET Co., 312-28 Adams St., Newark, N. J.
(See page 249.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

HOISTS

PORTABLE HOISTS

(See Cranes, Portable)

TRUCK BODY HOISTS

WOOD Hydraulic Hoist Co., 172 W. Fifth St., St. Paul, Minn.

WOOD Hydraulic Hoist & Body Co., 560 Franklin St., Detroit, Mich.

HOLDERS

BATTERY HOLDERS

(See also Boxes, Battery)

BECCO—See Michigan Motor Specialties Co.

CAMPBELL Co., A. S., 284 Commercial St., Boston, Mass. "Hermetic."

HERMETIC—See Campbell Co.

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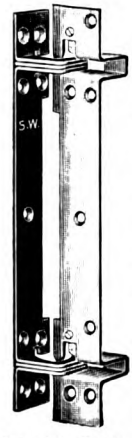
HINGES



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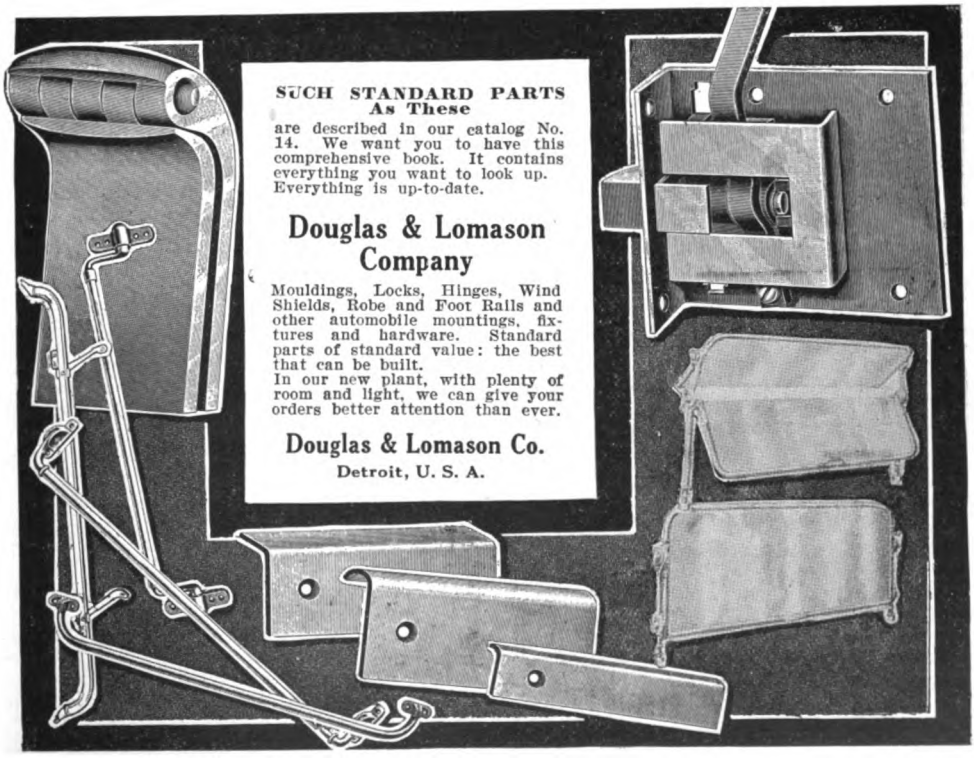

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HOLDERS (Continued)

BATTERY HOLDERS (Continued)

MICHIGAN Motor Specialties Co., 518-20 Woodbridge St. E., Detroit, Mich. "Becco."
(See page 137.)

PATTERSON—See Stanley & Patterson.

STANLEY & Patterson, 23 Murray St., New York, N. Y. "Patterson."

BOUQUET HOLDERS

AMERICAN Thermo Ware Co., 16 Warren St., New York, N. Y. (Importers.)

BALZER Co., Gus, 1777 Broadway, New York, N. Y.

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

GOODWIN & Kintz Co., Winsted, Conn.

HAWKES & Co., T. G., Corning, N. Y.

INTERNATIONAL Silver Co., Meriden, Conn.

LAW Engineering & Specialty Mfg. Co., Rochester, N. Y.

LIBERTY Cut Glass Works, Egg Harbor City, N. J.
(See page 213.)

STEUBEN Glass Works, Corning, N. Y.

WATSON Co., Mechanics St., Attleboro, Mass.

FLAG, PENNANT AND EMBLEM HOLDERS

ALUMINUM Goods Mfg. Co., Manitowoc, Wis.

BON Tour Mfg. Co., Cobleskill, N. Y.

HAWTHORNE Mfg. Co., 38 Spruce St., Bridgeport, Conn.

J. & J. Mfg. Co., 192 Piquette Ave., Detroit, Mich. "Universal."

UNIVERSAL—See J. & J. Mfg. Co.

LICENSE HOLDERS

ALL-AND-CO., Springfield, Mass. "Allen."

ALLEN—See All-And-Co.

APCO—See Auto Parts Co.

AUTO Parts Co., 702 Eddy St., Providence, R. I. "Apco."

AUTOMOBILE License Indicator Co., Lewisburg, Tenn. "Perfection." "Standard."

BALZER Co., Gus, 1777 Broadway, New York N. Y.

BOSTON—See Phillips, Fordham.

BROOKS & Sons, M. S., Chester, Conn.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O.

CORNELIUS Auto Sales Co., 809 Jefferson Ave., Toledo, O. "Perfect."

DAYTON Malleable Iron Co., Dayton, O.

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

GRAFFAM, W. S., Northampton, Mass. "Nobby."

HALLADAY Co., L. P., Dept. A., Streator, Ill.
(See page 359.)

KISKI Novelty Co., Leechburg, Va.

LEE Co., Wm. O., Port Huron, Mich.
(See page 113.)

MASCO—See Milwaukee Auto Specialty Co.

MILWAUKEE Auto Engine & Supply Co., 706-08 Winnebago St., Milwaukee, Wis.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Masco."
(See page 449.)

NEVEROUT—See Rose Mfg. Co.

NOBBY—See Graffam, W. S.

PERFECT—See Cornelius Auto Sales Co.

PERFECTION—See Automobile License Indicator Co.

PHILLIPS, Fordham (Allston), Boston, Mass. "Boston."

REED Co., 390 Main St., Mayfield, Cal.

REGAN & Kirwin Mfg. Co., 37 Shattuck St., Lowell, Mass.

ROSE Mfg. Co., 910 Arch St., Philadelphia, Pa. "Neverout."

SECURITY Co., 30 Shingiss St., Pittsburg, Pa.

STAFFORD Auto Lamp & Number Co., 1475 Michigan Ave., Chicago, Ill.

STANDARD—See Automobile License Indicator Co.

UNIQUE Findings & Supply Co., 36 Garnet St., Providence, R. I.

WHITEHOUSE LeCompte Mfg. Co., 42-54 Elm St., Newark, N. J.
(See page 235.)

OIL CAN HOLDERS

BECCO—See Michigan Motor Specialties Co.

BUFFUM Tool Co., Louisiana, Mo.

DAYTON Malleable Iron Co., Dayton, O.

HALLADAY Co., L. P., Dept. A., Streator, Ill. "Reliable."
(See page 359.)

MAYO Mfg. Co., 58 E. 18th St., Chicago, Ill. "Security."
(See page 325.)

MICHIGAN Motor Specialties Co., 518-20 Woodbridge St. E., Detroit, Mich. "Becco."
(See page 137.)

RELIABLE—See Halladay Co.

SECURITY—See Mayo Mfg. Co.

UNIQUE Findings & Supply Co., 36 Garnet St., Providence, R. I.

STARTING CRANK HOLDERS

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill.

B. E. Mfg. Co., 444 Broadway, New York, N. Y.
(See page 97.)

BAILEY Co., R. B., 406 W. Pico St., Los Angeles, Cal.

CAMPBELL—See Perkins Campbell Co.

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NEW MODELS

LIBERTY CUT GLASS Non-splashable Automobile Vases and Lamps

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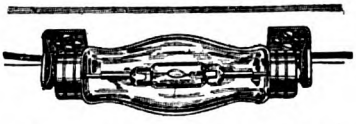

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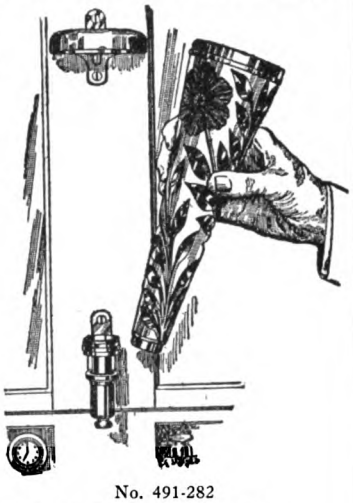

No. 491-282

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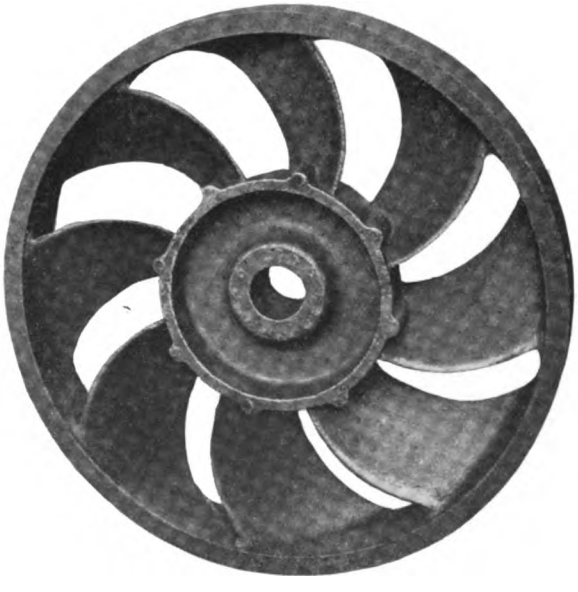

F. I. A. T. Fly-wheel.

Blades taper from ¼″ to ⅛″ in thickness.

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HOLDERS (Continued)

STARTING CRANK HOLDERS (Continued)

CARTER Co., George R., 1600-20 Kentucky Ave., Connersville, Ind.

ECONOMY Stay Co., Jefferson City, Mo.

FEESER Co., Frank S., 1102 Prospect St., Indianapolis, Ind. "Superior."

G & K—See Graton & Knight Mfg. Co.

GILBERT Mfg. Co., New Haven, Conn.

GORDON Co., J. P., 272 N. Fourth St., Columbus, O.

GRATON & Knight Mfg. Co., Worcester, Mass. "G & K."
(See page 65.)

HAGER & Son, Chas., 244-46 E. 52d St., New York, N. Y.

HAWES Storm Front Co., 14 N. Monroe St., Coldwater, Mich.

HOLLIDAY & Wyon Co., West & Ohio Sts., Indianapolis, Ind.

HOOVER Co., W. H., New Berlin, O.

KING Specialty Mfg. Co., 207 Washington St., Brookline, Mass.

NATHAN Novelty Mfg. Co., 90G Reade St., New York, N. Y.
(See page 209.)

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

NORTHERN Specialty Co., Ford Bldg., Detroit, Mich.

PERKINS Campbell Co., 634 Broadway, Cincinnati, O. "Campbell."
(See page 48.)

REINHOLD Belting & Supply Co., 499 Atlantic Ave., Brooklyn, N. Y.

SPECIALTY Harness Co., Dayton, Va.

SPRINGFIELD Harness Co., 55-61 Dwight St., Springfield, Mass.

STEVENS & Bro., A. A., 1234 Wabash Ave., Chicago, Ill.

SUPERIOR—See Feeser Co.

TIRE HOLDERS

(For carrying spare tires on cars)

ACME—See Cox Brass Mfg. Co.

ACME—See Garage Equipment Mfg. Co.

AETNA Brass Mfg. Co., 3870-90 Hamilton Ave., Cleveland, O.

ALDING—See Alsten & Goulding Co.

ALLEN Auto Specialty Co., 1926 Broadway, New York, N. Y.
(See page 97.)

ALSTEN & Goulding Co., 36 Foster St., Worcester, Mass. "Alding."

AMCO—See Chicago Electric Mfg. Co.

ATLAS—See Garage Equipment Mfg. Co.

ATTWOOD Brass Works, Scribner Ave. & Bowery St., Grand Rapids, Mich.
(See page 249.)

AUTO Brass Mfg. Co., 56 Friendship St., Providence, R. I.

AUTO Parts Mfg. Co., Jackson & Michigan Sts., Milwaukee, Wis. "Badger."

BADGER—See Auto Parts Mfg. Co.

BANNER—See Garage Equipment Mfg. Co.

BECKLEY-RALSTON Co., Michigan Ave. & Randolph St., Chicago, Ill. "Monarch."

BUCKEYE—See Central Brass & Fixture Co.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O. "Buckeye."

CLEVELAND Hardware Co., Cleveland, O.

COX Brass Mfg. Co., Albany, N. Y. "Monarch," "Duplex," "Acme."
(See page 357.)

DAYTON Malleable Iron Co., Dayton, O.

DETLOFF, A. J., 121 Champlain St., Detroit, Mich.

DETROIT Demountable Rim Co., Detroit, Mich.
(See page 341.)

DOUGLAS & Lomason Co., Detroit, Mich.
(See page 211.)

DUPLEX—See Cox Brass Mfg. Co.

DUPLEX—See Garage Equipment Mfg. Co.

E.-C. Sales Co., Postal Telegraph Bldg., Chicago, Ill.

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

EUREKA—See Garage Equipment Mfg. Co.

EXCELSIOR—See Garage Equipment Mfg. Co.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Acme," "Banner," "Duplex," "Eureka," "Gemco," "Hercules," "Ideal," "Milwaukee," "Premier," "Simplex," "Standard," "Superior," "Sampson," "Atlas," "Excelsior," "Reliable."
(See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

GILBERT Mfg. Co., New Haven, Conn.

GRAHAM & Co., James, 293 Wooster St., New Haven, Conn.
(See page 209.)

HALLADAY Co., L. P., Dept. A., Streator, Ill. "Reliable."
(See page 359.)

HERCULES—See Garage Equipment Mfg. Co

HERCULES—See Western Brass Mfg. Wks.

HIGHTON & Sons Co., Wm., Nashua, N. H.

IDEAL—See Garage Equipment Mfg. Co.

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

LE COMPTE Co., 65 Murray St., New York, N. Y.
(See page 215.)

MASCO—See Milwaukee Auto Specialty Co.

MEDINA Stamping & Machine Co., Medina, N. Y.

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

MILLER Hardware Co., T. T., 30-32 N. Fourth St., Easton, Pa.

MILWAUKEE—See Garage Equipment Mfg. Co.

MILWAUKEE Auto Engine & Supply Co., 706-08 Winnebago St., Milwaukee, Wis.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Masco."
(See page 449.)

MONARCH—See Beckley-Ralston Co.

MONARCH—See Cox Brass Mfg. Co.

MOTOR Patents Co., Dime Bank Bldg., Detroit, Mich. "Pervin."

NOONAN Tool & Machine Works, A. S., 130-36 St. James St., Rome, N. Y.

PERVIN—See Motor Patents Co.

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You Can Use Cork Parts In Your Cars Profitably

The most efficient material for gaskets, and washers for oil pans, transmissions, radiators, etc., is

ACCO CORK COMPOSITION

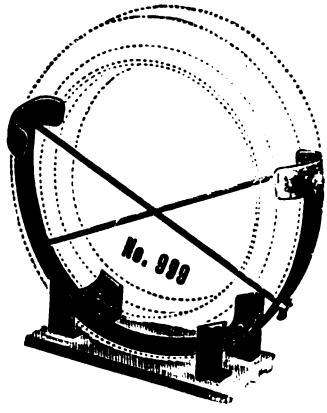
It will not absorb liquids; is not affected by oil, gasoline, grease or water, and eliminates all leakage.

Samples and information regarding Acco Gaskets and also cork floats, pads, clutch inserts, plugs, pulley rim covers, linoleum and cork carpet will be sent on request.

ARMSTRONG CORK COMPANY
124 Twenty-Third Street
PITTSBURGH, PA.

FORD TIRE CARRIERS

Running Board Complete with Belts no Straps Required



REAR complete with Lamp and License Pad Holders.
Also Lock, no straps required.
Clear of Exhaust Pipe.
Attached in 10 minutes.

LoCompto Co.
65 Murray Street
New York

No. 1

50 Years of Experience

manufacturing Acetylene Burners that have never been equalled is the record made by Geo. Bray & Co., Ltd., manufacturers of

BRAY BURNERS

Made in England and Sold Everywhere

"Roni":- is the only atmospheric burner producing a flat flame from a single orifice.

"Elta":- is the only acetylene burner that can be turned down without carbonizing.

"Luta":- is noted for its durability and freedom from burner troubles.

The tips of "Bray" Burners are practically indestructible. They are made of a non-porous enamel (no steatite or lava used) and will outlast the lamp.

Write for samples and prices.

WM. M. CRANE COMPANY
16-20 West 32nd St., New York. N. Y.

WE CUT

Generated Bevel Gears
Spur Gears
Helical Gears
Worms and Worm Gears

Your timing gears should be cut helical to insure quiet and accurate timing.
If you desire accuracy and workmanship above the average, we are in a position to meet your requirements.

ALBAUGH-DOVER COMPANY
2100 Marshall Boul., CHICAGO, ILL.

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HOLDERS (Continued)

TIRE HOLDERS (Continued)

PREMIER—See Garage Equipment Mfg. Co.

REESE Machine & Tool Works, S., 224-30 W. Main St., Plymouth, Pa.

REGAN & Kirwin Mfg. Co., 37 Shattuck St., Lowell, Mass.

RELIABLE—See Garage Equipment Mfg. Co.

RELIABLE—See Halladay Co.

RIMOLOX Tire Carrier Co., 1501-21 E. Illinois St., Evansville, Ind.

S. B. R. Specialty Co., 17-19 Princeton St., East Orange, N. J.

SAMPSON—See Garage Equipment Mfg. Co.

SIMPLEX—See Garage Equipment Mfg. Co.

SJOHOLM, N. P., 11 Westmoreland Pl., St. Louis, Mo.

SLY Mfg. Co., W. W., Cleveland, O.

SMITH, H. Lund, 199-203 Paterson St., Paterson, N. J.

SMITH & Co., Jos. N., Detroit, Mich.
(See page 547.)

STANDARD—See Garage Equipment Mfg. Co.

STAR Brass Works, 1721-23 Baltimore Ave., Kansas City, Mo.

SUNDERLAND Mfg. Co., 61 E. 24th St., Chicago, Ill.

SUPERIOR—See Garage Equipment Mfg. Co.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. "Hercules."
(See page 293.)

WHITEHOUSE LeCompte Mfg. Co., 42-54 Elm St., Newark, N. J.
(See page 235.)

WIENER-BARNET Co., 312-28 Adams St., Newark, N. J.
(See page 249.)

TOP HOLDERS

APPLAS Mfg. Co., 922 Fifth Ave., Moline, Ill.

AUTO Specialties Mfg. Co., 306 Fisher Bldg., Chicago, Ill. "Bair."
(See page 351.)

BAIR—See Auto Specialties Mfg. Co.

DETROIT Demountable Rim Co., Detroit, Mich.
(See page 341.)

GARAGE Equipment Mfg. Co., Milwaukee, Wis.
(See page 83.)

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

WATCH HOLDERS

(See also Clocks, Dashboard)

ADAMS Co., Henry T., 6823 S. Chicago Ave., Chicago, Ill. "Quick Action."

ANCHOR—See Metal Specialties Mfg. Co.

BURLEIGH, Geo. K., Penacook, N. H.

CALDWELL & Co., H. S., 74 Cortlandt St., New York, N. Y. "Readwell."

COWLES & Co., C., New Haven, Conn.
(See page 87.)

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

GOODWIN & Kintz Co., Winsted, Conn.

METAL Specialties Mfg. Co., 736-38 W. Monroe St., Chicago, Ill. "Anchor."

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y.
(See page 87.)

OSBORNE & Stephenson Mfg. Co., W. Main St., Plainville, Conn.
(See page 471.)

QUICK ACTION—See Adams Co.

READWELL—See Caldwell & Co.

SIMPLEX—See Sterling Mfg. Co.

STERLING Mfg. Co., Staunton, Va. "Simplex."

HOODS

MOTOR HOODS

A-Z Co., 530 W. 56th St., New York, N. Y.

BRISCOE Mfg. Co., Woodward & Baltimore Aves., Detroit, Mich.
(See page 331.)

BRISKIN Mfg. Co., 539 N. Capitol Ave., Indianapolis, Ind.

BUNN-HUTCHINSON Co., 2074 E. 22d St., Cleveland, O.

BUSH Mfg. Co., Hartford, Conn.
(See page 207.)

COLUMBUS Auto Brass Co., 767 N. Fourth St., Columbus, O.

DETROIT Auto Specialty Co., 909-11 Greenwood Ave., Detroit, Mich.

EUREKA Auto Parts Mfg. Co., 1915 Pine St., St. Louis, Mo.

FORSYTH Bros. Co., Harvey, Ill.

FRANKLIN Machine Co., 770 Franklin Ave., Brooklyn, N. Y.

HAYES Mfg. Co., Detroit, Mich.

ILLINOIS Auto Sheet Metal Works, 58-60 E. 16th St., Chicago, Ill.

JOHNSON'S Automobile Sheet Metal Works, W. N., 620-28 South J St., Richmond, Ind.

KELLS Mfg. Co., W. J., 521-25 W. 45th St., New York, N. Y.
(See page 203.)

KEYSTONE Sheet Metal Co., Ambridge, Pa.

KINSEY Mfg. Co., Toledo, O. "Kinwood."

KINWOOD—See Kinsey Mfg. Co.

LAWSON Co., F. H., Cincinnati, O.

LONG MFG. Co., Detroit, Mich.
(See page 327.)

MAYO Radiator Co., New Haven, Conn.

METAL Auto Parts Co., Industrial Bldg., Indianapolis, Ind.

MICHIGAN Stamping Co., 759-71 Bellevue Ave., Detroit, Mich.

MITCHELL & Son, G. F., 6501 Cedar Ave., Cleveland, O.

MOLINE Pressed Steel Co., East Moline, Ill.

PARAGON Auto-Parts Mfg. Co., 506 W. 53d St., New York, N. Y.

PERFEX Radiator Co., Racine, Wis.

R. & H. Sheet Metal Co., Abington, Mass.

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Axles
Crankshafts
Gears

Our product is known the country over. We make any style, any design. Let us figure on your work.

ATLAS FORGINGS

ATLAS DROP FORGE CO. LANSING MICHIGAN
"The Crank Makers of America"

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HOODS (Continued)

MOTOR HOODS (Continued)

REID Co., 1504 Third Ave., Moline, Ill.

SAGINAW Sheet Metal Works, Saginaw, Mich.

SARGEANT Mfg. Co., New & Summit Sts., Newark, N. J.

SPRINGFIELD Metal Body Co., Springfield, Mass. (See page 69.)

SUSSMAN & Rosenberg Mfg. Co., M., Tarrytown, N. Y.

TODD Mfg. Co., 320-24 Mary Pl., Minneapolis, Minn.

WISCONSIN Automobile Radiator Co., North Milwaukee, Wis.

HOOKS

SNAP HOOKS

ANCHOR—See North & Judd Mfg. Co.

COVERT Mfg. Co., Troy, N. Y.

FRAZER & Jones Co., Syracuse, N. Y.

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

NORTH & Judd Mfg. Co., New Britain, Conn. "Anchor."

SARGENT & Co., Water & Wallace Sts., New Haven, Conn.

WIENER-BARNET Co., 312-28 Adams St., Newark, N. J. (See page 249.)

WILCOX, Crittenden & Co., 83 Main St., Middletown, Conn.

HORNS

BULB HORNS

AUTOMOBILE Supply Mfg. Co., 220 Taaffe Pl., Brooklyn, N. Y. "Maxim."

HAWTHORNE Mfg. Co., 38 Spruce St., Bridgeport, Conn.

MAXIM—See Automobile Supply Mfg. Co.

NONPAREIL Horn Mfg. Co., 73-75 Wooster St., New York, N. Y.

RILEY-KLOTZ Mfg. Co., 17 Mulberry St., Newark, N. J.

STANDARD Metal Mfg. Co., Newark, N. J. (See page 219.)

SUPERIOR Lamp Mfg. Co. 136 W. 52d St., New York, N. Y.

ELECTRIC HORNS AND HORN BLOWERS

ADAMS-BAGNALL Electric Co., Cleveland, O.

AMERICAN Brass Products Co., Hartford, Conn. "Vollier."

AMERICAN Electric Co., State & 64th Sts., Chicago, Ill. "Samson," "Victor."

APOLLO—See Automobile Supply Mfg. Co.

AUTOMOBILE Supply Mfg. Co., 220 Taaffe Pl., Brooklyn, N. Y. "Newtone," "Electra," "Apollo."

BENJAMIN Electric Mfg. Co., 120 S. Sangamon St., Chicago, Ill.

CLERO—See Fitzgerald Mfg. Co.

DUPLEX Electric Mfg. Co., 5125 Coral St., Pittsburgh, Pa. "Safeguard."

ELECTRA—See Automobile Supply Mfg. Co.

ELECTRIC Horn & Specialty Co., 119 Columbia St., Utica, N. Y. "Oneita."

ELECTRIC Spark Appliance Co., 140-62 Imlay St., Brooklyn, N. Y. "Olympic."

FITZGERALD Mfg. Co., Torrington, Conn. "Clero." (See page 219.)

FRANKFORT—See Utica Steam Gauge Co.

GARFORD Mfg. Co., 2515 Taylor St., Elyria, O. "Tuto," "Tutoette," "Rexo."

HAWTHORNE Mfg. Co., 38 Spruce St., Bridgeport, Conn.

HEINZE Electric Co., Lowell, Mass. (See page 479.)

HI-LO—See Premier Electric Co.

HOLTZER-CABOT Electric Co., Brookline, Mass. "Reacto."

INTER-STATE Machine Co., Rochester, N. Y. "Sterling."

KA-HA-CO—See Kales-Haskel Co.

KALES-HASKEL Co., 441-53 Lafayete Blvd. Detroit, Mich. "Ka-Ha-Co."

KLAXET—See Lovell-McConnell Mfg. Co.

KLAXON—See Lovell-McConnell Mfg. Co.

KLAXONET—See Lovell-McConnell Mfg. Co.

LOVELL-McCONNELL Mfg. Co., Newark, N. J. "Klaxon," "Klaxonet," "Klaxet." (See page 219.)

NEWTONE—See Automobile Supply Mfg. Co.

NONPAREIL Horn Mfg. Co., 73-75 Wooster St., New York, N. Y.

O'BRIEN Electrophone Co., Hallowell, Me.

OLYMPIC—See Electric Spark Appliance Co.

ONEITA—See Electric Horn & Specialty Co.

PREMIER Electric Co., 4032-42 W. Ravenswood Ave., Chicago, Ill. "Hi-Lo," "Repello."

REACTO—See Holtzer-Cabot Electric Co.

RAPID FIRE—See Russell Electric Co.

REPELLO—See Premier Electric Co.

REXO—See Garford Mfg. Co.

RILEY-KLOTZ Mfg. Co., 17 Mulberry St., Newark, N. J.

RUSSELL Electric Co., Danbury, Conn. "Saxon," "Rapid Fire," "Saxonette."

SAFEGUARD—See Duplex Electric Mfg. Co.

SAMSON—See American Electric Co.

SAXON—See Russell Electric Co.

SAXONETTE—See Russell Electric Co.

SIRENO Co., 18-20 Rose St., New York, N. Y.

SPARKS-WITHINGTON Co., Jackson, Mich. "Sparton."

SPARTON—See Sparks-Withington Co.

STANDARD Metal Mfg. Co., Newark, N. J. (See page 219.)

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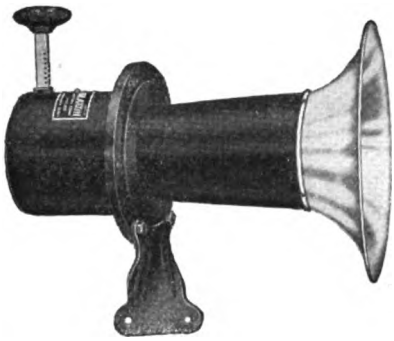


The Hand Klaxon, $10

The Hand Klaxon is a development of the original Hand Klaxon manufactured in 1909. It is in every particular a Klaxon. It has the true Klaxon note. It is sold under the regular Klaxon guarantee of permanent satisfaction. The Hand Klaxon is designed particularly for cars not equipped with batteries. It is complete in itself—no outside power is necessary.

LOVELL-McCONNELL MFG·COMPANY
Makers of the "KLAXON"· Newark, N·J·

The Clero Ford Magneto Horn

This live accessory is designed to run on the magneto of a Ford car. As it does not require dry batteries, it has no up-keep expense, and as it has no wearing parts it will last forever.

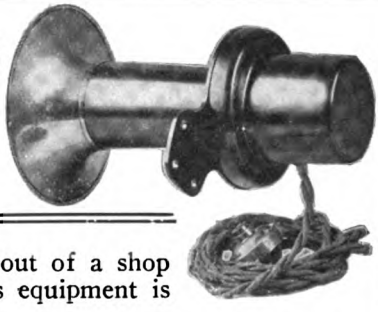
It is the most efficient, reliable and the loudest horn manufactured today.

Retail price, including wiring and push button, $4.00.

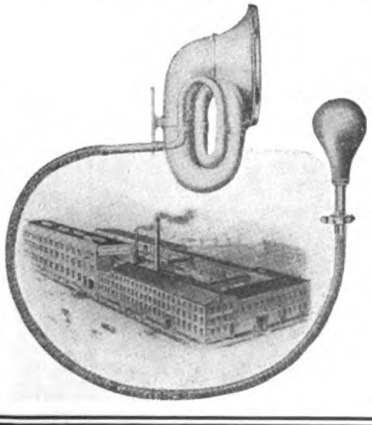
Finished in: Black and Nickel
Black and Brass
All Black.

Manufactured By
The Fitzgerald Mfg. Co. Torrington, Conn.

STANDARD HORNS



The best designed car that ever came out of a shop is not complete unless every detail of its equipment is of the best.



A horn of "STANDARD" quality denotes a horn of superior service.

We manufacture a more complete line of BULB and ELECTRIC HORNS than any other concern in the United States.

Our big, handsome, musical tone signals are unexcelled in design, material and workmanship.

Write for prices and complete information.

Send for our catalog.

Standard Metal Mfg. Co.
NEWARK, NEW JERSEY

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HORNS (Continued)

ELECTRIC HORNS AND HORN BLOWERS (Continued)

STERLING—See Inter-State Machine Co.

SUPERIOR Lamp Mfg. Co., 136 W. 52d St., New York, N. Y.

TURNER Electric Supply Co., 18-20 S. 20th St., Birmingham, Ala.

TUTO—See Garford Mfg. Co.

TUTOETTE—See Garford Mfg. Co.

TYPHOON Signal Co., N. Chicago St., Lincoln, Ill.

UTICA Steam Gauge Co., Frankfort, N. Y. "Frankfort."

VICTOR—See American Electric Co.

VOLIER—See American Brass Products Co.

WARNER Electric Co., Walnut & 20th Sts., Muncie, Ind.

EXHAUST HORNS

(Tube Horns or Chimes and Whistles)

AERMORE—See Fulton Co.

AHCO—See Arnold-Hough Co.

AMCO—See Chicago Electric Mfg. Co.

APCO—See Auto Parts Co.

ARNOLD-HOUGH Co., 124 Washington St., Providence, R. I. "Ahco."

AUTO Equipment Mfg. Co., 18 Pearl St., Newton, Mass.

AUTO Parts Co., 702 Eddy St., Providence, R. I. "Apco."

AUTOCHIME—See Gray-Hawley Mfg. Co.

AUTOLARM—See Gray-Hawley Mfg. Co.

BARCO Brass & Joint Co., 212-22 W. Illinois St., Chicago, Ill.

BIG Four Horn Co., Watseka, Ill.

BLAZER—See Motor Specialties Co.

CAMPBELL Mfg. Co., 3715 Wentworth Ave., Chicago, Ill. "Harkaway."

CHICAGO Electric Mfg. Co., 523-29 Van Buren St., Chicago, Ill. "Amco."

CLIMAX Electric Works, New Salem, Mass.

COMING Mfg. Co., Railway Exchange Bldg., Chicago, Ill. "Trinity."

EMPIRE—See S. B. R. Specialty Co.

EXO—See Troy Auto Specialty Co.

F. A. M. Auto Supply Co., 698 Main St., Buffalo, N. Y.

FOGG—See Motor Specialties Co.

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill. "Howler."

FULTON Co., 726 National Ave., Milwaukee, Wis. "Aermore."

GABRIEL Horn Mfg. Co., 1407 40th St., N. E., Cleveland, O.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Melody," "Superior."
(See page 83.)

GRAY-HAWLEY Mfg. Co., 937-43 Jefferson Ave., Detroit, Mich. "Autochime," "Autolarm."

HARKAWAY—See Campbell Mfg. Co.

HOWLER—See Fowler Lamp & Mfg. Co.

INTERNATIONAL Automobile Supply Co., 117 W. South Water St., Chicago, Ill. "Victor."

JERICHO—See Randall-Faichney Co.

JUBILEE—See Randall-Faichney Co.

MELODY—See Garage Equipment Mfg. Co.

MINERVA Hardware Mfg. Co., Minerva, O.

MOTOR Specialties Co., Waltham, Mass. "Blazer," "Fogg."

MOUND Tool Co., Seventh & Hickory Sts., St. Louis, Mo.
(See page 475.)

NIGHTINGALE—See Riley-Klotz Mfg. Co.

PROVIDENT Motor Supply Co., 515 N. Broad St., Philadelphia, Pa. "Red Devil."

RANDALL-FAICHNEY Co., Boston, Mass. "Jericho," "Jubilee."

RED DEVIL—See Provident Motor Supply Co.

RILEY-KLOTZ Mfg. Co., 17 Mulberry St., Newark, N. J. "Nightingale."

S. B. R. Specialty Co., 17-19 Princeton St., East Orange, N. J. "Empire."

SCREAM Sales Co., 2724 Michigan Ave., Chicago, Ill.

STAR Brass Works, 1721-23 Baltimore Ave., Kansas City, Mo.

SUPERIOR—See Garage Equipment Mfg. Co.

TRINITY—See Coming Mfg. Co.

TROY Auto Specialty Co., Troy, N. Y. "Exo."

VICTOR—See International Automobile Supply Co.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

MECHANICAL HORNS

A-K-ORN—See Wilson Co.

AUTOMOBILE Supply Mfg. Co., 220 Taaffe Pl., Brooklyn, N. Y. "Motophone," "Cablephone."

BEARTONE—See Oakes Co.

CABLEPHONE—See Automobile Supply Mfg. Co.

ELECTRIC Spark Appliance Co., 140-62 Imlay St., Brooklyn, N. Y. "Olympic."

KLAXON—See Lovell-McConnell Mfg. Co.

LOVELL-McCONNELL Mfg. Co., Newark, N. J. "Klaxon."
(See page 219.)

M-L—See Miller-Lovatt Co.

MILLER-LOVATT Co., Weatherly, Pa. "M-L."

MOTOPHONE—See Automobile Supply Mfg. Co.

NONPAREIL Horn Mfg. Co., 73-75 Wooster St., New York, N. Y. "Pilot."

OAKES Co., Indianapolis, Ind. "Beartone."

OLYMPIC—See Electric Spark Appliance Co.

OVER-TONE—See Overholt Co.

OVERHOLT Co., S. Henderson & Fourth Sts., Galesburg, Ill. "Over-Tone."

PIEL Co., G., 13th St. & Boulevard, Long Island City, N. Y.

PILOT—See Nonpareil Horn Mfg. Co.

ROCHESTER Mfg. Co., 347 Blossom Rd., Rochester, N. Y.

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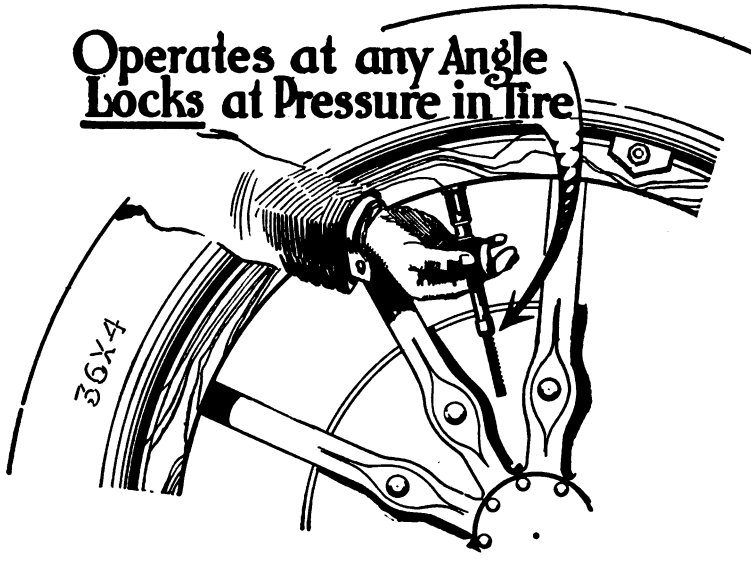
The New Positive Lock Stop Twitchell Air Gauge

The Standard Tire Pressure Gauge for 1915



Tire Insurance for $1.00

The Best Gauge to Use

Consequently the best gauge to *sell*—

The Positive Lock Stop Twitchell Air Gauge

The best way to secure the stocking of your goods by dealers everywhere is to make an article so satisfactory and so perfect that the demand for it will be universal.

Our experience during 1913 and 1914 has convinced us that we are manufacturing such an article in the

Positive Lock Stop TWITCHELL

Both this year and last year, we had difficulty in satisfying the demand.
Don't waste your time and strength trying to push something that is anchored and can't move.

Stock Goods for which there is a demand.

Send in your orders now and be sure of a full supply this Spring.
Nearly all jobbers carry the TWITCHELL. If yours does not, write us direct, giving his name, and we will see that you are supplied.

The Twitchell Gauge Company

1208 Michigan Avenue Chicago, Illinois

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HORNS (Continued)

MECHANICAL HORNS (Continued)

SERVICE Motor Supply Co., 640 Washington Blvd., Chicago, Ill.

SPARKS-WITHINGTON Co., Jackson, Mich. "Sparton-Echo."

SPARTON-ECHO—See Sparks-Withington Co.

STEWART-WARNER Speedometer Corp., 1904 Diversey Blvd., Chicago, Ill. (See page 555.)

TALKING Horn Co., Middletown, N. Y.

WILSON Co., John, 220 Pleasant St., Boston, Mass. "A-K-Orn."

SIREN HORNS

INTER-STATE Machine Co., Rochester, N. Y. "Sterling."

O'BRIEN Electrophone Co., Hallowell, Me.

SIRENO Co., 18-20 Rose St., New York, N. Y.

STERLING—See Inter-State Machine Co.

HOSE

RUBBER HOSE

ACME Rubber Mfg. Co., Trenton, N. J.

BOSTON Belting Co., 84 Linden Park St., Boston, Mass.

BOSTON Woven Hose & Rubber Co., 110 Portland St., Cambridge, Mass.

BOWERS Rubber Works, 68-70 Sacramento St., San Francisco, Cal.

CINCINNATI Rubber Mfg. Co., Cincinnati, O. (See page 369.)

CLEVELAND—See Mechanical Rubber Co.

COMBINATION Rubber Mfg. Co., Bloomfield, N. J.

CONTINENTAL Rubber Works, Erie, Pa.

DIAMOND Rubber Co., Akron, O.

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J.

ESSEX Rubber Co., Trenton, N. J.

FEDERAL Rubber Mfg. Co., Milwaukee, Wis.

GOODRICH Co., B. F., Akron, O.

HAMILTON Rubber Mfg. Co, Trenton, N. J. (See page 359.)

HIDE, Leather & Belting Co., Indianapolis, Ind. (See page 241.)

HOME Tire Co., Trenton, N. J.

MANHATTAN Rubber Mfg. Co., Passaic, N. J.

MECHANICAL Rubber Co., C. & P. & Nickel Plate R. R., Cleveland, O. "Cleveland."

MILFORD Rubber Works, Milford, Ill.

MINERALIZED Rubber Co., 165 Chambers St., New York, N. Y.

NATIONAL India Rubber Co., Bristol, R. I.

NEW Jersey Car Spring & Rubber Co., Wayne & Brunswick Sts., Jersey City, N. J.

NEW York Belting & Packing Co., 91 Chambers St., New York, N. Y.

NEW York Rubber Co., 84 Reade St., New York, N. Y.

PENNSYLVANIA Rubber Co., Jeannette, Pa.

QUAKER City Rubber Co., 629 Market St., Philadelphia, Pa.

REPUBLIC Rubber Co., Youngstown, O.

THERMOID Rubber Co., Trenton, N. J. (See page 57.)

VOORHEES Rubber Mfg. Co., 18-46 Bostwick Ave., Jersey City, N. J. (See page 291.)

WHITEHEAD Bros. Rubber Co., Trenton, N. J.

WOVEN Steel Hose & Rubber Co., Trenton, N. J. (See page 531.)

HOUSINGS

PRESSED STEEL AXLE HOUSINGS

AVERY Stamping Co., 5209 Lakeside Ave., Cleveland, O.

BOSSERT Co., Utica, N. Y. (See page 223.)

CROSBY Co., Buffalo, N. Y. (See page 157.)

DETROIT Pressed Steel Co., 1800 Mt. Elliott Ave., Detroit, Mich. (See page 555.)

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa. (See page 157.)

PARISH Mfg. Co., Reading, Pa. (See page 481.)

SMITH Co., A. O., Milwaukee, Wis. (See page 367.)

WORCESTER Pressed Steel Co., Worcester, Mass. (See page 157.)

HUBS

WHEEL HUBS

AMERICAN Ball-Bearing Co., Cleveland, O. (See page 51.)

BOSSERT Co., Utica, N. Y. (See page 223.)

DETROIT Pressed Steel Co., 1800 Mt. Elliott Ave., Detroit, Mich. (See page 555.)

JACKSON Drop Forging Co., Jackson, Mich.

KELSEY Wheel Co., Detroit, Mich.

METAL Products Co., Detroit, Mich. (See page 509.)

MOTT Wheel Works, Utica, N. Y. (See page 453.)

SALISBURY Wheel & Mfg. Co., Jamestown, N. Y. (See page 601.)

TIMKEN-DETROIT Axle Co., Detroit, Mich.

WALKER-WEISS Axle Co., Flint, Mich.

WESTON-MOTT Co., Flint, Mich. (See page 411.)

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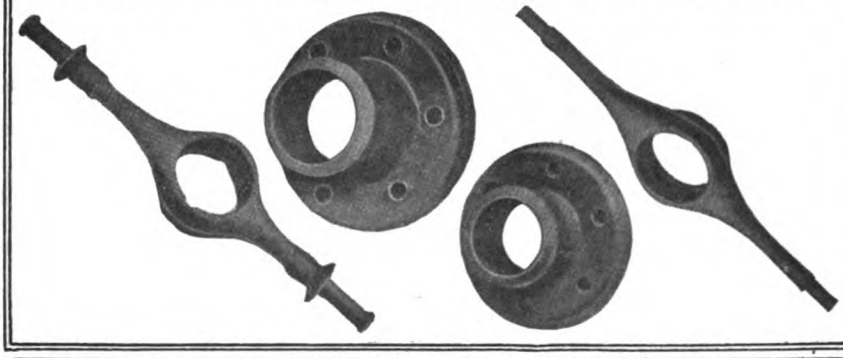
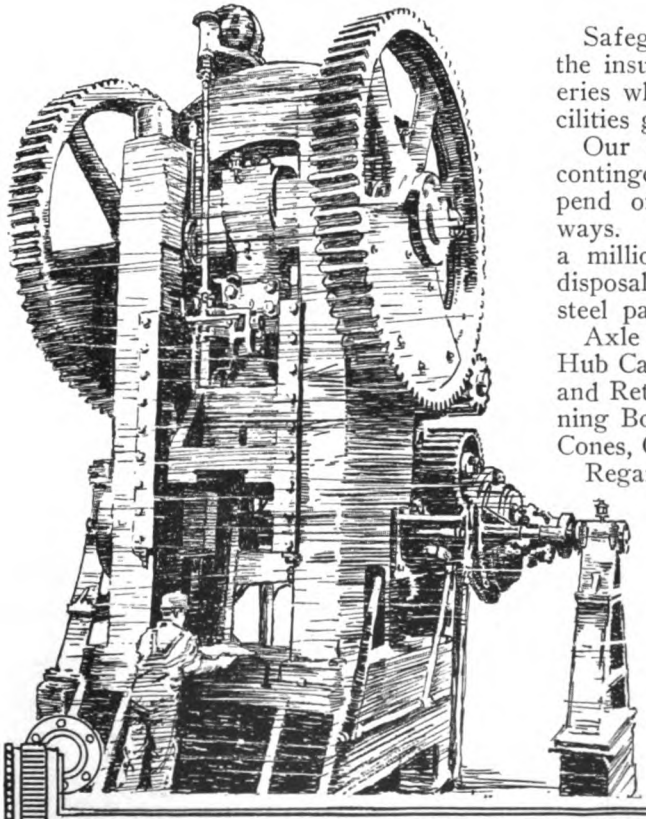
BOSSERT

Pressed Metal Goods for Automobiles





Safeguard your production with the insurance of dependable deliveries which our manufacturing facilities give.

Our delivery contracts have no contingency clause. You can depend on scheduled shipments always. Our engineering staff and a million dollar plant is at your disposal for any of over 200 pressed steel parts for automobiles.

Axle Housings, Brake Drums, Hub Caps, Hub Flanges, Ball Cups and Retainers, Step Hangers, Running Boards, Torque Arms, Clutch Cones, Clutch Discs, etc.

Regardless of the size of your order, our facilities are ample to accommodate you.

"The Bossert Way is Best"

THE BOSSERT CO.
Utica, New York

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HYDROMETERS

TESTING HYDROMETERS

(For testing Battery Electrolyte, Gasoline, etc.)

AMERICAN Thermo Ware Co., 16 Warren St., New York, N. Y. (Importers.) "Autocrat."

AUTOCRAT—See American Thermo Ware Co.

EDELMANN & Co., E., 225 W. Illinois St., Chicago, Ill.

FREEZOMETER—See Taylor Instrument Cos.

GENERAL Scientific Equipment Co., 2000 Market St., Philadelphia, Pa.

MARSHALL, Walter & Co., Milwaukee, Wis.

QUEEN-GRAY Co., 616-18 Chestnut St., Philadelphia, Pa.

SIMPLEX Hydrometer Co., 314-20 Market St., Newark, N. J.

STORAGE Battery Supply Co., 239 E. 27th St., New York, N. Y.

TAGLIABUE Mfg. Co., C. J., Bush Terminal Bldg., Brooklyn, N. Y.

TAYLOR Instrument Cos., 95 Ames St., Rochester, N. Y. "Freezometer."

WEINHAGEN, H., 159-65 Leonard St., New York, N. Y.

INDICATORS

AUTOMOBILE SPEED INDICATORS

(See Speedometers)

CARBURETOR ADJUSTMENT INDICATORS

WHITTELSEY Co., Dept. 2, 11 Broadway, New York, N. Y. (See page 525.)

DISTANCE OR MILEAGE INDICATORS

(See Meters, Distance)

GRADE INDICATORS

(See Meters, Grade)

SPARK INDICATORS

(See Gaps, Spark)

TAIL LIGHT INDICATORS

(Device to show when tail light goes out.)

CAMPBELL Mfg. Co., 3715 Wentworth Ave., Chicago, Ill. "Tell-Tale."

GUARANTEED Specialties Co., 588 Broad St., Newark, N. J.

TELL-TALE—See Campbell Mfg. Co.

INFLATORS

TIRE INFLATORS

(See Pumps; also Tanks)

INJECTORS

BOILER FEEDING INJECTORS

AMERICAN Injector Co., 173 14th Ave., Detroit, Mich.

PENBERTHY Injector Co., Detroit, Mich.

GREASE INJECTORS

(See Guns, Grease)

INTENSIFIERS

SPARK INTENSIFIERS

(See Gaps, Spark)

IRONS

BODY OR TOP IRONS

ASHTABULA Bow Socket Co., Ashtabula, O.

BLAKESLEE Forging Co., Plantsville, Conn.

CLEVELAND Hardware Co., Cleveland, O.

CORTLAND Carriage Goods Co., 115 Pt. Watson St., Cortland, N. Y.

CORTLAND Forging Co., Cortland, N. Y.

COWLES & Co., C., New Haven, Conn. (See page 87.)

CRANDAL, Stone & Co., Binghamton, N. Y. (See page 369.)

DESOCO—See Detroit Socket Co.

DETROIT Socket Co., 814 Jefferson Ave., W., Detroit, Mich. "Desoco."

GENERAL Drop Forge Co., Buffalo, N. Y. (See page 277.)

MICHIGAN Bolt & Nut Works, ft. Meldrum Ave., Detroit, Mich.

NEWTON & Son, W. H., 127 Elm St., Cortland, N. Y.

RANDS Mfg. Co., Holden & Lincoln Aves., Detroit, Mich.

SCHERER & Co., H., Detroit, Mich.

SLAT IRONS

(For Bow Sockets—See Sockets, Bow)

AMESBURY Brass & Foundry Co., Amesbury, Mass.

COWLES & Co., C., New Haven, Conn. (See page 87.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

TIRE IRONS

(See Tools, Tire)

Complete Index to Classification appears on Pages 8 to 26.

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That name EDISON

is depended upon absolutely by millions of electric lamp buyers who want sturdy, long-lasting lamps that give white, brilliant light with the lowest possible cost for current.

Whether for the lighting of a car or a home —for the inside of an office or the outside of a store—or for any other lighting need, you, too, should insist on

EDISON MAZDA LAMPS

That name EDISON assures you of the 35 long years of EDISON experience in making hundreds of millions of good lamps. And MAZDA stands for the vast lamp-science research known as MAZDA Service.

On automobile lamps the EDISON MAZDA mark means years of closest cooperation with makers of cars and of lighting systems. Besides the auto lamps EDISON MAZDAS are made in many sizes—from tiny bulbs up to great, big 1000-watt lamps.

EDISON LAMP WORKS

of General Electric Company

HARRISON NEW JERSEY

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JACKS

LIFTING JACKS

A. B. C.—See Motor Specialties Co.

AJAX—See Lennox Jack Works.

ALRITE—See National Jack & Mfg. Co.

ASHLAND Mfg. Co., Ashland, O. "Eureka," "Atlas," "Speeder." (See page 227.)

ATLAS—See Ashland Mfg. Co.

BADGER—See Walker-Moore Mfg. Co.

BARRETT—See Duff Mfg. Co.

BARTH Mfg. Co., 74 L St., Milwaukee, Wis. (See page 227.)

BATAVIA Clamp Co., 131 Center St., Batavia, N. Y. "Colts."

BUCKEYE Jack Mfg. Co., Alliance, O.

BUDA Co., Harvey, Ill.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O.

CHICAGO Jack & Supply Co., 175 W. Jackson Blvd., Chicago, Ill.

COLTS—See Batavia Clamp Co.

CROSBY Co., 2120 Vodell St., Pittsburg, Pa.

DUFF Mfg. Co., Preble Ave., Pittsburg, (N. S.), Pa. "Barrett."

ELITE Mfg. Co., Ashland, O. "Reliable," "Ideal."

EUREKA—See Ashland Mfg. Co.

GIANT—See S. B. R. Specialty Co.

HANSON, Henry L., 25 Union St., Worcester, Mass.

HARTFORD Suspension Co., 172 Bay St., Jersey City, N. J. (See page 513.)

IDEAL—See Elite Mfg. Co.

JOYCE-CRIDLAND Co., 329 S. Linden Ave., Dayton, O. "XX Century."

KAZOO—See National-Standard Co.

LEADER—See National-Standard Co.

LENNOX Jack Works, 1104 Prospect Ave., S. E., Cleveland, O. "Little Giant."

LITTLE GIANT—See Lennox Jack Works.

LITTLE GIANT—See National Jack & Mfg. Co.

LITTLE GIANT—See Pratt Mfg. Co.

MOTOR Specialties Co., Waltham, Mass. "A. B. C."

NATIONAL Jack & Mfg. Co., 130-34 S. Clinton St., Chicago, Ill. "Alrite," "Little Giant," "Starite."

NATIONAL-STANDARD Co., Niles, Mich. "Kazoo," "Standard," "Leader."

OLIVER Mfg. Co., 326 S. Desplaines St., Chicago, Ill. "Peerless."

PEERLESS—See Oliver Mfg. Co.

PERFECT—See Walker-Moore Mfg. Co.

PRATT Mfg. Co., Wm. E., 35 W. Lake St., Chicago, Ill. "Little Giant," "Pup."

PUP—See Pratt Mfg. Co.

RELIABLE—See Elite Mfg. Co.

S. B. R. Specialty Co., 17-19 Princeton St., East Orange, N. J. "Giant."

SHAWVER Co., rear 31 W. Pleasant St. Springfield, O. "Springfield."

SPEEDER—See Ashland Mfg. Co.

SPRINGFIELD—See Shawver Co.

STANDARD—See National-Standard Co.

STARITE—See National Jack & Mfg. Co.

TRIUMPH—See Walker-Moore Mfg. Co.

VAN—See Vanderpool Co.

VANDERPOOL Co., 723 W. Mulberry St., Springfield, O. "Van."

WALKER-MOORE Mfg. Co., 310 Walker St., Racine, Wis. "Badger," "Triumph," "Perfect."

XX Century—See Joyce-Cridland Co.

SPECIAL JACKS

(Wheeled, Two and Four Wheel Lifting, Etc.)

ADAMS Jack Co. of America, H. W. Hellman Bldg., Los Angeles, Cal.

AMES Mfg. Co., Franklin, Pa.

BECKERT & Son, William, 1001 E. Ohio St., N. S., Pittsburg, Pa.

BURROUGHS Lift & Truck Co., Racine, Wis

CADY Patent Appliance Co., 755 Central Ave., Cleveland, O. (See page 227.)

CANTON Foundry & Mfg. Co., Canton, O. "Universal." (See page 437.)

EXCEL Jack Mfg. Co., 27 Lansdowne St., Boston, Mass.

ODELL Automatic Jack Co., Odell, Ill.

READING Automobile Co., 126-28 N. Fifth St., Reading, Pa.

RUB-ON Mfg. Co., 89 Brayton St., Buffalo, N. Y.

STUCKER, J. M., Ottawa, Kans.

UNIVERSAL—See Canton Foundry & Mfg. Co.

WEAVER Mfg. Co., Springfield, Ill.

WHETSTONE & Co., John H., Lapeer, Mich.

TIRE SAVING JACKS

(For holding car off the floor when not in use)

ASHLAND Mfg. Co., Ashland, O. "Eureka." (See page 227.)

AUTO Jack Works, 300-08 Michigan St., La Grange, Ind. "Detroit."

AUTOMATIC Tire Rest Co., 1733 McGee St., Kansas City, Mo.

BEARD Auto Lift Co., Pleasant Lake, Ind.

BICYCLE Step Ladder Co., 6 W. Randolph St., Chicago, Ill.

BUFFINGTON & Co., C. A., Berkshire, N. Y.

CANNON, W. B., Park St. & Kalamazoo Ave., Vicksburg, Mich.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O.

DAYTON Malleable Iron Co., Dayton, O.

DETROIT—See Auto Jack Works.

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O. "Emco."

Complete Index to Classification appears on Pages 8 to 26.

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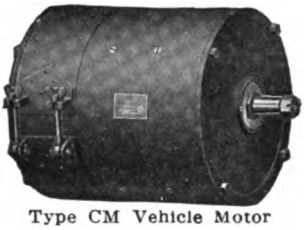
Diehl
TRADE MARK

TYPE C. M. ELECTRIC VEHICLE MOTORS



Type CM Vehicle Motor

Standard Motor ratings cover all sizes of equipment. Small pleasure vehicle motors; Motors for Commercial truck service; Slow Speed Motors for direct connection to transmission shafts are a special feature of this line. Write for Bulletin No. 130.

Diehl Manufacturing Co.
Elizabethport, N. J.

LIFTING JACKS
TIRE SAVERS
STORAGE STANDS
THE
EUREKA
LINE

The most complete, the best built and the most economical line of automobile jacks on the market.

These jacks are made of a different construction for cars of different weights and the prices range from $1.00 to $5.00.

THE EUREKA TIRE SAVERS are a great invention. They come in sets of four made of the best workmanship and for the complete sets they sell at $6.50 and $7.50.

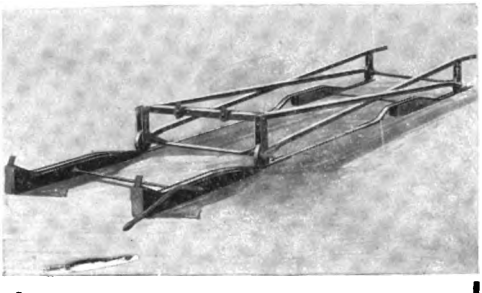
THE EUREKA STORAGE STAND —not a jack only a support—costs per set of four, $2.75.

These are retail prices from which we quote dealers liberal discounts. This is a highly salable line and should be found in every dealers' establishment.

Ashland Manufacturing Co.
ASHLAND, OHIO

Building Jacks has been our business for 18 years. We make them from one to ten ton.

BARTH MFG. CO.
74 L Street,
MILWAUKEE,
WIS.



RUN IN GARAGE AS USUAL—OVER IT.

The NEWWAY
The CADY
AUTOMATIC AUTO JACK
Time—Labor—Money-Saver

POSITIVELY AUTOMATIC.—Run your car on it and without a move on your part it lifts all four wheels clear of the floor. Prevents waste tire mileage caused by leaving car resting on the tires and standing in grease and oil on the garage floor. Makes it easier to wash car and put on chains. Remove one or all wheels or make repairs or adjustments—absolutely no trouble. SAVES ITS COST IN A SHORT TIME. Your trade will appreciate it and the saving in expense that it makes. Fully guaranteed. WRITE FOR DETAILS.

THE CADY PATENT APPLIANCE CO.
755 Central Ave. Cleveland, O.
PATENT APPLIED FOR.

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JACKS (Continued)

TIRE SAVING JACKS (Continued)

ELITE Mfg. Co., Ashland, O. "Reliable."

EMCO—See Eberhard Mfg. Co.

EUREKA—See Ashland Mfg. Co.

GARAGE Equipment Mfg. Co., Milwaukee, Wis.
(See page 83.)

GARLICK Auto Jack & Prop Co., 250 12th Ave., Paterson, N. J.

HART Mfg. Co., 520 N. Main St., Findlay, O.

HASLUP Motor Jack Co., Sidney, O.

HOCO—See Hoeft & Co.

HOEFT & Co., Ashland Ave. & Kinzie St., Chicago, Ill. "Hoco."

JIFFY JAX—See Lennox Jack Works.

JUSTRITE—See National Jack & Mfg. Co.

LENNOX Jack Works, 1104 Prospect Ave., S. E., Cleveland, O. "Jiffy Jax."

MOORE—See Walker-Moore Mfg. Co.

MORGAN Mfg. Co., John St., Newport, R. I.

NATIONAL Jack & Mfg. Co., 130-34 S. Clinton St., Chicago, Ill. "Justrite."

NATIONAL-STANDARD Co., Niles, Mich. "Standard."

PERFECT—See Pratt Mfg. Co.

PRATT Mfg. Co., Wm. E., 35 W. Lake St., Chicago, Ill. "Perfect."

RACINE—See Walker-Moore Mfg. Co.

RELIABLE—See Elite Mfg. Co.

S. & S. Automatic Tireaze Co., Frankfort, Kans.

SEDGWICK Mfg. Co., Third & Chestnut Sts., Richmond, Ind.

STANDARD—See National-Standard Co.

UNIQUE—See United States Mfg. Co.

UNITED States Mfg. Co., Mansfield, O. "Unique."

WALKER-MOORE Mfg. Co., 310 Walker St., Racine, Wis. "Moore," "Racine."

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

JARS

RUBBER BATTERY JARS

AMERICAN Hard Rubber Co., 9 Mercer St., New York, N. Y. "Volcan," "Mercury."

DIAMOND Rubber Co., Akron, O.

LUZERNE Rubber Co., Trenton, N. J.

MERCURY—See American Hard Rubber Co.

STOKES Rubber Co., Jos., Trenton, N. J.

VOLCAN—See American Hard Rubber Co.

JIGS

SPEEDOMETER GEAR CENTERING JIGS

WEBER Automobile Supply Co., 6 E. Kiowa St., Colorado Springs, Colo.

JOBBERS

SUPPLY JOBBERS

(This is a list of Jobbers and Dealers in Automobile Supplies who advertise in this publication)

POST & Lester Co., 112 Allyn St., Hartford, Conn.
(See page 495.)

PRUDEN Hardware Co., W. E., 864-66 Eighth Ave., New York, N. Y.
(See page 467.)

ZINKE Co., 1326 Michigan Ave., Chicago, Ill.
(See page 365.)

JOINTS

BALL JOINTS

(For spark and throttle connections)

BILLINGS & Spencer Co., Hartford, Conn.

BIRCHWOOD, C. W., Jacksonville, Fla.

CHICAGO Screw Co., Homan Ave. & Fillmore St., Chicago, Ill. "Security."
(See pages 231 and 345.)

CINCINNATI Ball Crank Co., Cincinnati, O.
(See page 137.)

GREER, Fredric, 525 W. Van Buren St., Chicago, Ill.

MECHANICAL & Electrical Mfg. Co., 2225 Prairie Ave., Chicago, Ill. "Memco."

MEMCO—See Mechanical & Electrical Mfg. Co.

PENINSULAR Milled Screw Co., Lafayette St., Detroit, Mich.

PERFECTION—See Porter & Co.

PORTER & Co., W. S., 608 S. Dearborn St., Chicago, Ill. "Perfection."

SECURITY—See Chicago Screw Co.

SMITH Mfg. Co., F. H., 3037 Carroll Ave., Chicago, Ill.

SPEEDOMETER SWIVEL JOINTS

OGDEN Fibre Gear & Tire Co., Columbus, Ind.

UNIVERSAL JOINTS

ACME Universal Joint Mfg. Co., 1425 Fulford St., Kalamazoo, Mich.
(See page 229.)

BLOOD Bros., Machine Co., Ransom St. & S. Haven R. R., Kalamazoo, Mich.

EVANS—See Merchant & Evans Co.

HARTFORD Auto Parts Co., Hartford, Conn.

JAMESVILLE Mfg. Co., Batavia, N. Y.

K-B—See Kinsler-Bennett Co.

KINSLER-BENNETT Co., 69 Vernon St., Hartford, Conn. "K-B."
(See page 231.)

KONIGSLOW Mfg. Co., Otto, E. 35th St. & Perkins Ave., Cleveland, O.

LEHMAN, I., 2187 E. Second St., Cleveland, O.

MERCHANT & Evans Co., Philadelphia, Pa. "Evans."

Complete Index to Classification appears on Pages 8 to 26.

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A C M E
Universal Joints

These are the best universal joints that a motor car manufacturer could put in his product. They embody every essential feature necessary to make it the nearest perfect Universal Joint for use in motor cars and trucks.

ACME JOINTS are remarkable for their simplicity and durability and are best adapted to withstand the severe wear and strain to which they are subjected in motor car usage.

The ACME can be removed from a car without moving a unit of the power transmission. This feature alone gives it a great advantage over any other joint in the market.

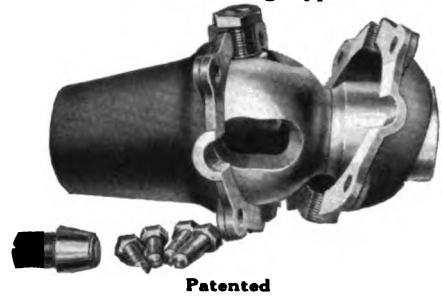
They are so accurately made that they are interchangeable and necessary repairs can be made without difficulty.

Ask us to prove that Acme Joints are better than those you are now using—we'll do it.

The Acme Universal Joint Mfg. Company

1425 Fulford St., Kalamazoo, Mich.

"Standard" Universal Joints
Roller Bearing Type



Patented

The "Standard" line of joints is complete from starter and cyclecar to the largest trucks.

If you want the very best in universal joints, use our roller bearing type. It is the only joint having a perfectly universal movement. No "lag and catchup" as in ordinary joints. Adjustable for wear, self oiling to moving parts by centrifugal force.

Our Types 3P and 4P are the simplest and most compact models and are also very attractive in price. Type 4P consists of a universal joint built within a large square slip sleeve, thus doing away with the troublesome slip connection or expensive spline.

We use the best quality of alloy steels, carefully harden and treat wearing parts; in fact build Standard joints the best in every way that can be done. Send in your B.P. and let us figure with you. Circulars on request.

The Universal Machine Co.
Adams St., BOWLING GREEN, OHIO

SPICER UNIVERSAL JOINTS

FOR STRENGTH AND DURABILITY

THE JOINT FOR AUTO MANUFACTURERS AND REBUILDERS TO USE

Every bearing surface is case-hardened and ground. Superior quality of material and workmanship enter into it. OIL TIGHT and DUST PROOF, insuring long life of parts. All parts interchangeable.

SPICER MFG. COMPANY
PLAINFIELD, N. J.

K. FRANKLIN PETERSON,
122 S. Michigan Blvd., Chicago.

L. D. BOLTON,
2215 Dime Savings Bank Bldg., Detroit.

Foreign Representative:
BENJAMIN WHITTAKER,
21 State St., New York.

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JOINTS (Continued)

UNIVERSAL JOINTS (Continued)

MICHIGAN Auto-Joint Co., 814 Bowery St., Grand Rapids, Mich.

MICHIGAN Wheel Co., Canal & Newberry Sts., Grand Rapids, Mich.

MUTUAL Machine Co., 25 Wells St., Hartford, Conn. "Warrens."

NEW England Auto Parts Mfg. Co., Kimball Bldg., Boston, Mass.

SPICER Mfg. Co., Plainfield, N. J. (See page 229.)

TRIO Mfg. Co., 1192-1206 Bellevue Ave., Detroit, Mich.

UNIVERSAL Machine Co., Adams St., Bowling Green, O. (See page 229.)

WARRENS—See Mutual Machine Co.

KEYS

ACETYLENE GAS TANK KEYS

AUTO Specialty Co., West Haven, Conn.

BUFFUM Tool Co., Louisiana, Mo.

EDELMANN & Co., E., 225 W. Illinois St., Chicago, Ill.

GILBERT Mfg. Co., New Haven, Conn.

HARRIS & Reed Mfg. Co., 1500-22 W. 15th St., Chicago, Ill.

MOSSBERG Co., Frank, Attleboro, Mass. (See page 561.)

NELSON Mfg. Co., A., 564-72 W. Randolph St., Chicago, Ill.

PREST-O-LITE Co., 1400 Speedway, Indianapolis, Ind. (See page 515.)

RITZ-WOLLER, Oliver C., 536-38 S. Clark St., Chicago, Ill.

UNIQUE Findings & Supply Co., 36 Garnet St., Providence, R. I.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. (See page 293.)

WHITEHOUSE LeCompte Mfg. Co., 42-54 Elm St., Newark, N. J. (See page 235.)

KITS

TIRE REPAIR KITS

(See also Cement, Tire; also Patches, Tire; also Plugs, Tire; also Sleeves, Tire)

GOODRICH Co., B. F., Akron, O.

GOODYEAR Tire & Rubber Co., Akron, O.

H. J. K. Co., 26½ Canal St., Dayton, O. "Lightning."

HAZEN-BROWN Co., Court St., Brockton, Mass.

LIGHTNING—See H. J. K. Co.

M. & M. Mfg. Co., Akron, O.

MICHELIN Tire Co., Milltown, N. J.

PEERLESS Cement Co., 39 Viaduct, Akron, O.

SAMPSON—See Stevens & Co.

STEVENS & Co., 373 Broadway, New York, N. Y. "Sampson." (See page 231.)

TINGLEY & Co., Chas. O., Rahway, N. J.

YATMAN Rubber Co., 257-69 Mt. Pleasant Ave., Newark, N. J.

KNUCKLES

STEERING KNUCKLES

(See Axles; also Forgings)

LACE

COACH LACE, WEBBING AND CORD

BRIDGEPORT Coach Lace Co., 1731-37 Broadway, New York, N. Y. (See page 153.)

COLUMBIA—See Horstmann Co.

HORSTMANN Co., Wm. H., Fifth & Cherry Sts., Philadelphia, Pa. "Columbia."

SCHLEGEL Mfg. Co., College Ave. & N. Goodman St., Rochester, N. Y.

VOGT Mfg. & Coach Lace Co., 408-10 St. Paul St., Rochester, N. Y.

LACING

FABRIC RADIATOR LACING

(See also Leather, Rawhide Lace)

GILMER Co., L. H., 52 N. Seventh St., Philadelphia, Pa. (See page 397.)

STANDARD Woven Fabric Co., Framingham, Mass. (See page 55.)

LAMPS

ACETYLENE LAMPS OR HEAD-LIGHTS

AMERICAN Lamp Works, 253 W. 47th St., New York, N. Y. "Liberty."

B. & L. Auto Lamp Co., 507-09 W. 35th St., New York, N. Y. (See page 271.)

BADGER Brass Mfg. Co., Lyman Ave., Kenosha, Wis. "Solar."

BROWN Mfg. Co., John W., Columbus, O.

CHICAGO Auto Lamp Works, 900-04 W. Lake St., Chicago, Ill. "Diamond."

COLUMBIA—See Hine-Watt Mfg. Co.

CORCORAN Lamp Co., Reading Rd., Cincinnati, O.

DIAMOND—See Chicago Auto Lamp Works.

DIETZ Co., R. E., 60 Laight St., New York, N. Y. "Majestic," "Victor."

DRESSEL Railway Lamp Works, 3860-80 Park Ave., New York, N. Y.

E & J—See Edmunds & Jones Mfg. Co.

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"SECURITY" BALL JOINTS

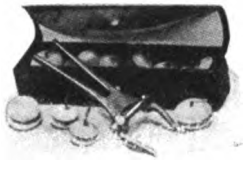
Not too tight nor too loose—Always in proper adjustment—No Cotter Pins to lose—No Screws to come out—Easily put in place—Impossible to come apart—Ball Head in line with rod—Firm Joint—No Rattle—

THE CHICAGO SCREW CO.
Homan Ave. & Fillmore St., Chicago

Sampson Repair Plug

For Automobile Inner Tubes—

Requires No Cement No Cleaning No Gasoline Just the Bare Hands



Has Been Tested To the Limit and Never Found Wanting

The Quickest Permanent Repair Ever Devised

The feature of the day in the automobile world—*an instant roadside repair as good as a shop could make it*—as permanent as vulcanizing—will last as long as the life of the tube.

The edge of the soft rubber plug feathers out under the pressure—reinforces and becomes a part of the tube itself.

You simply punch a hole where the puncture has occurred, with the punch furnished with the kit; then insert the soft rubber plug, screw it up tight with the thumb, break off the wire, and you are ready for travel with a clean, permanent job.

Sampson Repair Kit, as illustrated, containing Tool and 1 dozen assorted Plugs, in permanent Kit.....**$2.50**
Sampson Repair Outfit, containing Tool and half-dozen assorted Plugs, in Carton, **$1.50**
Sampson Repair Plugs, Per Dozen.**$1.75**
Sampson Repair Tool.....**$0.50**

STEVENS & CO., 373 Broadway, New York

Detroit Lubrication is exact

The Detroit Force Feed Oiler puts precisely the right amount of oil in the right place at the right time.

Every drop of oil is forced to the place where it is needed, by a valveless pump. There is no chance for the oil to fail to reach the right spot.

And every drop of oil is measured—never too much, but always enough. The Detroit Force Feed Oiler is insurance against wasted oil and a damaged engine.

Write for catalog P-89 and full information

DETROIT LUBRICATOR COMPANY
DETROIT, U.S.A

Largest manufacturers of lubricating devices in the world. Also manufacturers of Stewart Carburetors

UNIVERSAL JOINTS

K.B. CO. — KANT BUST

BEST FOR

Commercial Cars AND Pleasure Vehicles

Made from the finest Drop Forgings, especially case-hardened throughout. Our Universal Joints have no equal for Quality, Design, High Finish, and Skilled Workmanship.

We guarantee deliveries to commence within two or three weeks from receipt of specifications.

Write us for our catalog and get our prices

KANT BUST — K.B. CO.

MADE IN — HARTFORD, CONN. —
BY
THE KINSLER-BENNETT CO.
69 Vernon Street
WESTERN SALES AGENTS
AMERICAN DISTRIBUTING CO., Jackson, Mich.

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LAMPS (Continued)

ACETYLENE LAMPS OR HEAD-LIGHTS (Continued)

EDMUNDS & Jones Mfg. Co., 432-52 Lawton Ave., Detroit, Mich. "E & J." **(See page 233.)**

GRAY & Davis, Boston, Mass. **(See page 159.)**

HALL Lamp Co., C. M., Rivard & Hancock Sts., Detroit, Mich.

HAWTHORNE Mfg. Co., 38 Spruce St., Bridgeport, Conn. "Old Sol."

HINE-WATT Mfg. Co., 180 N. Market St., Chicago, Ill. "Columbia."

HOFACKER Mfg. Co., 555 W. 42d St., New York, N. Y. **(See page 235.)**

INDIANA Lamp Co., Connersville, Ind. "Lunar."

LIBERTY—See American Lamp Works.

LUNAR—See Indiana Lamp Co.

MAJESTIC—See Dietz Co.

NEVEROUT—See Rose Mfg. Co.

OLD SOL—See Hawthorne Mfg. Co.

P-G-N—See Pagin Lamp Co.

PAGIN Lamp Co., J. R., 1323-25 S. Michigan Ave., Chicago, Ill. "P-G-N."

ROSE Mfg. Co., 910 Arch St., Philadelphia, Pa. "Neverout."

SOLAR—See Badger Brass Mfg. Co.

SUPERIOR Lamp Mfg. Co., 136 W. 52d St., New York, N. Y.

VICTOR—See Dietz Co.

VICTOR Lamp Co., Colerain & Sassafras Sts., Cincinnati, O.

WIDMAN & Co., J. C., 14th & 15th Sts. & G. T. Ry., Detroit, Mich.

DASH LAMPS

(See Lamps, Electric Dash)

ELECTRIC LAMPS OR HEAD-LIGHTS

(See Headlights, Electric)

ELECTRIC DASH OR GAUGE LAMPS

APELCO—See Apple Electric Co.

APPLE Electric Co., Newark, N. J. "Apelco."

CAMPBELL Co., A. S., 284 Commercial St., Boston, Mass. "Cello."

CELLO—See Campbell Co.

CHICAGO Electric Mfg. Co., 2817 S. Halsted St., Chicago, Ill. "Handy."

COLUMBUS Auto Brass Co., 767 N. Fourth St., Columbus, O.

CONNECTICUT Telephone & Electric Co., Meriden, Conn. **(See page 401.)**

COWLES & Co., C., New Haven, Conn. **(See page 87.)**

CULVER-STEARNS Mfg. Co., Worcester, Mass. **(See page 139.)**

DOLLY Electric Specialty Co., 1461 Michigan Ave., Chicago, Ill.

EDMUNDS & Jones Mfg. Co., 432-52 Lawton Ave., Detroit, Mich. **(See page 233.)**

FAW, J. H., 41 Warren St., New York, N. Y.

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill.

GUIDE Motor Lamp Mfg. Co., 11400 W. Madison Ave., Cleveland, O.

HANDY—See Chicago Electric Mfg. Co.

HOLT & Beebee Co., 51 Chardon St., Boston, Mass.

METAL Specialties Mfg. Co., 736-38 W. Monroe St., Chicago, Ill. "Presto."

MORSE, Frank W., 516 Atlantic Ave., Boston, Mass.

PRESTO—See Metal Specialties Mfg. Co.

ROSCO—See Rosen & Co.

ROSEN & Co., A. W., 610-14 Broadway, New York, N. Y. "Rosco." **(See page 139.)**

S-H—See Stuart-Howland Co.

STUART-HOWLAND Co., 131-41 Federal St. Boston, Mass. "S-H."

VESTA Accumulator Co., 2100 Indiana Ave., Chicago, Ill.

ELECTRIC GAUGE LAMPS

(See Lamps, Electric Dash)

ELECTRIC HAND OR INSPECTION LAMPS

(Lamp and flexible cord for attachment to ignition battery)

ADAMS-BAGNALL Electric Co., Cleveland, O.

AMERICAN Enamel Co., Neville St., Providence, R. I. "Britelite."

AMERICAN Ever Ready Co., 316 Hudson St., New York, N. Y. "Ever Ready."

ANDREWS & Co., J. W., Chicago, Ill.

BRITELITE—See American Enamel Co.

CAMPBELL Co., A. S., 284 Commercial St., Boston, Mass. "Cello."

CELLO—See Campbell Co.

CHICAGO Electric Mfg. Co., 2817 S. Halsted St., Chicago, Ill. "Handy."

CLUM Mfg. Co., Montgomery Bldg., Milwaukee, Wis.

CONNECTICUT Telephone & Electric Co., Meriden, Conn. **(See page 401.)**

COWLES & Co., C., New Haven, Conn. **(See page 87.)**

CRESCENT—See McGill Mfg. Co.

CULVER-STEARNS Mfg. Co., Worcester, Mass. **(See page 139.)**

CUMINGS Bros., 901-03 S. Saginaw St., Flint, Mich.

CUNO Engineering Corp., 80 S. Vine St., Meriden, Conn.

DELTA Electric Co., 313-405 E. Fourth St., Marion, Ind.

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LAMPS (Continued)

ELECTRIC HAND OR INSPECTION LAMPS (Continued)

DOLLY Electric Specialty Co., 1461 Michigan Ave., Chicago, Ill.

EDMUNDS & Jones Mfg. Co., 432-52 Lawton Ave., Detroit, Mich.
(See page 233.)

EVER READY—See American Ever Ready Co.

EVEREADY Storage Battery Works of National Carbon Co., 514 W. 57th St., New York, N. Y.
(See page 233.)

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill.

GENERAL Electric Co., Schenectady, N. Y.

GUIDE Motor Lamp Mfg. Co., 11400 W. Madison Ave., Cleveland, O.

HANDY—See Chicago Electric Mfg. Co.

HANDY-ANDY Electric Co., 1046 Lawrence Ave., Chicago, Ill.

HARVARD Electric Co., 525 W. Van Buren St., Chicago, Ill.

KAUFMANN, Chas., 417 N. Broadway, Santa Ana, Cal.

MABEYS Electric & Mfg. Co., 940 N. Pennsylvania St., Indianapolis, Ind.

McGILL Mfg. Co., 34 Oak St., Valparaiso, Ind. "Thumbswitch," "Crescent."

NIAGARA Searchlight Co., Eighth St. & Ferry Ave., Niagara Falls, N. Y.

NITELITE—See Providence Electric Mfg. Co.

METAL Specialties Mfg. Co., 736-38 W. Monroe St., Chicago, Ill. "Presto."

MORSE, Frank W., 516 Atlantic Ave., Boston, Mass. "Pomo."

PARKER-HAMMERTON Mfg. Co., 122 Milk St., Boston, Mass.

POMO—See Morse, Frank W.

PREMIER Electric Co., 4032-42 W. Ravenswood Ave., Chicago, Ill. "Stickalite."

PRESTO—See Metal Specialties Mfg. Co.

PROVIDENCE Electric Mfg. Co., 23 Broad St., Providence, R. I. "Nitelite."

ROSCO—See Rosen & Co.

ROSEN & Co., A. W., 610-14 Broadway, New York, N. Y. "Rosco."
(See page 139.)

RUSSELL & Co., T. F., 170 Summer St., Boston, Mass.

S.-H.—See Stuart-Howland Co.

STICKALITE—See Premier Electric Co.

STUART-HOWLAND Co., 131-41 Federal St. Boston, Mass. "S-H."

THUMBSWITCH—See McGill Mfg. Co.

VESTA Accumulator Co., 2100 Indiana Ave., Chicago, Ill.

WOOD Mfg. Co., Fairfield, Conn.

ELECTRIC INSPECTION LAMPS

(See Lamps, Electric Hand)

ELECTRIC SIDE AND TAIL LAMPS

ADAMS-BAGNALL Electric Co., Cleveland, O.

ADAMS & Westlake Co., Chicago, Ill. "Adlake."
(See page 153.)

ADLAKE—See Adams & Westlake Co.

AIKEN—See Dodge, Frank.

AUTO Fender Safety Lamp Co., Corinth, N. Y.

B. & L. Auto Lamp Co., 507-09 W. 35th St., New York, N. Y.
(See page 271.)

BADGER Brass Mfg. Co., Lyman Ave., Kenosha, Wis. "Solar."

BOESCH Lamp Co., 1135 Mission St., San Francisco, Cal.

BROWN Mfg. Co., John W., Columbus, O.

BUFFALO Lamp Co., 106-10 Broadway, Buffalo, N. Y.

CAMPBELL Co., A. S., 284 Commercial St., Boston, Mass. "Cello."

CELLO—See Campbell Co.

CHICAGO Auto Lamp Works, 900-04 W. Lake St., Chicago, Ill.

COLUMBUS Auto Brass Co., 767 N. Fourth St., Columbus, O. "Pathfinder."

COMBINATION Tail Light Co., 954 Tremont St., Boston, Mass. (Tail lamps only). "Universal."

COPELAND, E. J., Boyer Bldg., Detroit, Mich.

COWLES & Co., C., New Haven, Conn.
(See page 87.)

DEARBORN Hardware Mfg. Co., 2911-19 Carroll Ave., Chicago, Ill.

DIETZ Co., R. E., 60 Laight St., New York, N. Y. "Excelsior."

DODGE, Frank, 189 Massachusetts Ave., Boston, Mass. "Aiken."

DRESSEL Railway Lamp Works, 3860-80 Park Ave., New York, N. Y.

EDMUNDS & Jones Mfg. Co., 432-52 Lawton Ave., Detroit, Mich.
(See page 233.)

ELECTRIC Auto-Lite Co., Toledo, O.
(See page 381.)

ELECTROBOLA—See Garage Equipment Mfg. Co.

ENGLISH & Mersick Lamp & Foundry Co., 249 Park St., New Haven, Conn.

ESTERLINE Co., 228 E. South St., Indianapolis, Ind. "Golden Glow."

EXCELSIOR—See Dietz Co.

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Electrobola."
(See page 83.)

GEM Stamped Steel Co., Everett Ave. & Blvd., (Chelsea Station), Boston Mass. (Tail lamps only.)

GOLDEN GLOW—See Esterline Co.

GRAY & Davis, Boston, Mass.
(See page 159.)

GUIDE Motor Lamp Mfg. Co., 11400 W. Madison Ave., Cleveland, O.

HALL Lamp Co., C. M., Rivard & Hancock Sts., Detroit, Mich.

HAMMER Co., E. A., 1839 Euclid Ave., Cleveland, O.

HOFACKER Mfg. Co., 555 W. 42d St., New York, N. Y.
(See page 235.)

HOLT & Beebee Co., 51 Chardon St., Boston, Mass.

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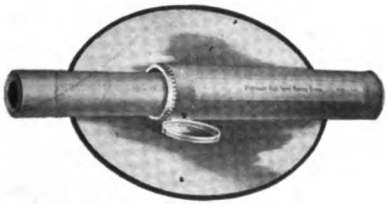

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LAMPS (Continued)

ELECTRIC SIDE AND TAIL LAMPS (Continued)

INDIANA Lamp Co., Connersville, Ind. "Lunar."

LUNAR—See Indiana Lamp Co.

NEVEROUT—See Rose Mfg. Co.

P-G-N—See Pagin Lamp Co.

PAGIN Lamp Co., J. R., 1323-25 S. Michigan Ave., Chicago, Ill. "P-G-N."

PATHFINDER—See Columbus Auto Brass Co.

PORTLAND Auto Specialty Co., Fidelity Bldg., Portland, Me.

ROSCO—See Rosen & Co.

ROSE Mfg. Co., 910 Arch St., Philadelphia, Pa. "Neverout."

ROSEN & Co., A. W., 610-14 Broadway, New York, N. Y. "Rosco." (See page 139.)

SOLAR—See Badger Brass Mfg. Co.

STAFFORD Auto Lamp & Number Co., 1475 Michigan Ave., Chicago, Ill. (Tail lamps only.)

SUPERIOR Lamp Mfg. Co., 136 W. 52d St., New York, N. Y.

UNIVERSAL—See Combination Tail Light Co.

VESTA Accumulator Co., 2100 Indiana Ave., Chicago, Ill.

VICTOR Auto Parts Co., Second & Elm Sts., Cincinnati, O.

VICTOR Lamp Co., Colerain & Sassafras Sts., Cincinnati, O.

WESTINGHOUSE Electric & Mfg. Co. (E. Pittsburgh), Pittsburg, Pa.

WHITE Mfg. Co., 155 Cannon St., Bridgeport, Conn.

WIDMAN & Co., J. C., 14th & 15th Sts., & G. T. Ry., Detroit, Mich.

ELECTRIC TAIL LAMPS

(See Lamps, Electric Side and Tail)

GAUGE LAMPS

(See Lamps, Electric Dash or Gauge)

HAND LAMPS

(See Lamps, Electric Hand)

INSPECTION LAMPS

(See Lamps, Electric, Hand or Inspection)

MINIATURE INCANDESCENT LAMPS

BANNER Electric Works, Youngstown, O.

BRILLIANT Electric Co., Electric Bldg., Cleveland, O.

BRYAN-MARSH Electric Works, 431 S. Dearborn St., Chicago, Ill.

BUCKEYE Electric Works, B. of L. E. Bldg., Cleveland, O.

COLONIAL Electric Works, Warren, O.

COLUMBIA Incandescent Lamp Co., Equitable Bldg., St. Louis, Mo.

DOMESTIC Tungsten Lamp Co., 575 Bergenline Ave., West New York, N. J.

EDISON Lamp Works of General Electric Co., Harrison, N. J. (See page 225.)

ELUX Miniature Lamp Works, 324 Lafayette St., New York, N. Y.

FEDERAL Miniature Lamp Division, National Lamp Works of General Electric Co., 501 S. Jefferson St., Chicago, Ill. (See page 235.)

FOSTORIA Incandescent Lamp Works, Fostoria, O.

FRANCO—See Interstate Electric Novelty Co.

GENERAL Electric Co., Schenectady, N. Y.

GENERAL Incandescent Lamp Co., Electric Bldg., Cleveland, O.

HOWARD Miniature Lamp Co., Ampere, N. J. "Reliable."

INDEPENDENT Lamp & Wire Co., 1733 Broadway, New York, N. Y.

INTERSTATE Electric Novelty Co., 29 Park Pl., New York, N. Y. "Franco." (See page 139.)

JAEGER Co., H. J., 68-70 Hudson St., Hoboken, N. J. (See page 237.)

McCANDLESS, H. W, 67-69 Park Pl., New York, N. Y. (See page 237.)

PACKARD Lamp Works, Warren, O.

PEERLESS Lamp Works, Warren, O.

RELIABLE—See Howard Miniature Lamp Co.

STERLING Electric Lamp Works, Warren, O.

U. S. Incandescent Lamp Co., Laclede Bldg., St. Louis, Mo.

VACUU-RITE Lamp Co., 155-59 W. Division St., Chicago, Ill.

WESTINGHOUSE Lamp Co., Bloomfield, N. J.

OIL SIDE AND TAIL LAMPS

ADAMS & Westlake Co., Chicago, Ill. "Adlake." (See page 153.)

ADLAKE—See Adams & Westlake Co.

BADGER Brass Mfg. Co., Lyman Ave., Kenosha, Wis. "Solar."

BOESCH Lamp Co., 1135 Mission St., San Francisco, Cal.

BROWN Mfg. Co., John W., Columbus, O "Perfection."

CHAMPION—See Dietz Co.

COLD BLAST—See Ham Mfg. Co.

CORCORAN Lamp Co., Reading Rd., Cincinnati, O.

COWLES & Co., C., New Haven, Conn. (See page 87.)

DAINTY—See Dietz Co.

DIETZ Co., R. E., 60 Laight St., New York, N. Y. "Sterling, Jr.," "Queen," "Regal," "Ideal," "Orient," "Dainty," "Royal," "Champion," "Union," "Royal Junior."

DRESSEL Railway Lamp Works, 3860-80 Park Ave., New York, N. Y.

E & J—See Edmunds & Jones Mfg. Co.

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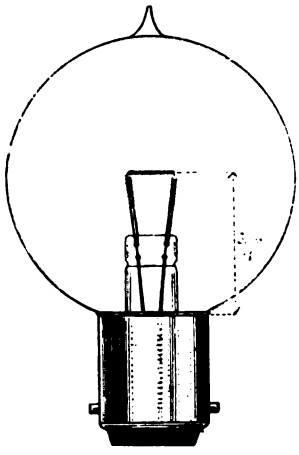

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LAMPS (Continued)

OIL SIDE AND TAIL LAMPS (Continued)

EDMUNDS & Jones Mfg. Co., 432-52 Lawton Ave., Detroit, Mich. "E & J". (See page 233.)

ENGLISH & Mersick Lamp & Foundry Co., 249 Park St., New Haven, Conn.

GRAY & Davis, Boston, Mass. (See page 159.)

HALL Lamp Co., C. M., Rivard & Hancock Sts., Detroit, Mich.

HAM Mfg. Co., C. T., 721 Oak St., Rochester, N. Y. "Cold Blast."

HOFACKER Mfg. Co., 555 W. 42d St., New York, N. Y. (See page 235.)

IDEAL—See Dietz Co.

IDEAL Lamp Co., 216-18 Main St., Cincinnati, O.

INDIANA Lamp Co., Connersville, Ind. "Lunar."

LUNAR—See Indiana Lamp Co.

NEVEROUT—See Rose Mfg. Co.

ORIENT—See Dietz Co.

PERFECTION—See Brown Mfg. Co.

QUEEN—See Dietz Co.

REGAL—See Dietz Co.

ROSE Mfg. Co., 910 Arch St., Philadelphia, Pa. "Neverout."

ROYAL—See Dietz Co.

ROYAL JUNIOR—See Dietz Co.

SOLAR—See Badger Brass Mfg. Co.

STERLING, JR.—See Dietz Co.

SUPERIOR Lamp Mfg. Co., 136 W. 52d St., New York, N. Y.

UNION—See Dietz Co.

VICTOR Lamp Co., Colerain & Sassafras Sts., Cincinnati, O.

WIDMAN & Co., J. C., 14th & 15th Sts. & G. T. Ry., Detroit, Mich.

SIDE LAMPS

(See Lamps, Electric Side; also Lamps, Oil Side)

TAIL LAMPS

(See Lamps, Electric Side and Tail; also Lamps, Oil, Side and Tail)

TUNGSTEN LAMPS

(See Lamps, Miniature Tungsten)

WIRE LAMPS

KENYON Searchlight Co., 11-15 Woodbridge St., Detroit, Mich.

LAVA

AMERICAN Lava Co., Chattanooga, Tenn.

STEWARD Mfg. Co., D. M., Chattanooga, Tenn.

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ARTIFICIAL OR IMITATION LEATHER

BOSTON Artificial Leather Co., 200 Fifth Ave., New York, N. Y. "Moroccoline."

BULL DOG—See Mutty Co.

CARR Co., F. S., Boston, Mass. "Neverleek." (See page 123.)

CHASE & Co., L. C., Boston, Mass. (See page 317.)

du PONT Fabrikoid Co., Wilmington, Del. "Fabrikoid." (See page 241.)

FABLEA—See Fabric Leather Co.

FABRIC Leather Co., 432 Fourth Ave., New York, N. Y. "Fablea."

FABRIKOID—See du Pont Fabrikoid Co.

GRANITOL—See Kearney Co.

IMPERIAL—See Kearney Co.

KEARNEY Co., T. F., 220 Devonshire St., Boston, Mass. (Importers.) "Granitol," "Imperial."

KERATOL Co., South & Van Buren Sts., Newark, N. J.

MAROKENE Co., 6 Fletcher St., New York, N. Y.

MOROCCOLINE—See Boston Artificial Leather Co.

MUTTY Co., L. J., Boston, Mass. "Bull Dog." (See page 239.)

NEVERLEEK—See Carr Co.

O'BANNON Corp., 200 Fifth Ave., New York, N. Y. (See page 241.)

PANTASOTE Co., 11 Broadway, New York, N. Y.

TEXTILEATHER Co., 212 Fifth Ave., New York, N. Y.

FRICTION LEATHER

(For lining brakes and clutches—See also Banding Brake; also Belting, Leather; also Fibre, Hard)

AMERICAN Belting & Tanning Co., 135 Oliver St., Boston, Mass.

BONNER & Barnewell, 30 Church St., New York, N. Y.

CHICAGO Belting Co., 113-25 N. Green St., Chicago, Ill.

CHICAGO Rawhide Mfg. Co., 1301 Elston Ave., Chicago, Ill.

COE & Brown, 202-04 George St., New Haven, Conn.

DETROIT Clutch Cover Co., 62-64 Jefferson Ave., Detroit, Mich.

DETROIT Leather Specialty Co., 275 Beecher Ave., Detroit, Mich.

DUCKWALL Belting & Hose Co., 516 Capitol Blvd., Indianapolis, Ind.

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LEATHER (Continued)

FRICTION LEATHER (Continued)

EXCELMO—See Missouri Belting Co.

G & K—See Graton & Knight Mfg. Co.

GRATON & Knight Mfg. Co., Worcester, Mass. "G & K."
(See page 65.)

HIDE, Leather & Belting Co., Indianapolis, Ind.
(See page 241.)

HOUGHTON & Co., E. F., 240 W. Somerset St., Philadelphia, Pa.

HUDSON Belting Co., 1-3 Eaton Pl., Worcester, Mass.

M.L.B.—See Milwaukee Leather Belting Co.

MAU-SHERWOOD Supply Co., 1616 W. Third St., Cleveland, O. "Suregrip."

MILWAUKEE Leather Belting Co., 499 12th St., Milwaukee, Wis. "M. L. B."

MISSOURI Belting Co., Grand Ave. & La Salle St., St. Louis, Mo. "Excelmo."

NATIONAL Leather Belting Co., 342 E. 38th St., New York, N. Y.

NATIONAL Leather Mfg. Co., Niles, Mich.

NEW York Leather Belting Co., 51 Beekman St., New York, N. Y.

PROVIDENCE Belting Co., 25 Charles St., Providence, R. I.

RAHMANN & Co., Geo., 31 Spruce St., New York, N. Y.

SCHIEREN Co., Chas. A., 30 Ferry St., New York, N. Y.

SHULTZ Belting Co., 402 Barton St., St. Louis, Mo.

SUREGRIP—See Mau-Sherwood Supply Co.

TAYLOR Belting Co., 247 S. Meridian St., Indianapolis, Ind.

WAYNE Belting Co., 1212 Second Ave., Detroit, Mich.

WILDER-MANNING Tanning Co., Waukegan, Ill.

WILLIAMS & Sons, I. B., Dover, N. H.

NATURAL LEATHER

AMERICAN Oak Leather Co., Cincinnati, O.

ASHTABULA Hide & Leather Co., Ashtabula, O.

ATLANTIC Leather Co., 173 Wright St., Newark, N. J.

BADGER State Tanning Co., Sheboygan, Wis.

BEAVER—See Straus & Sons, M.

BLANCHARD Bro. & Lane, 20 Bruen St., Newark, N. J.

BRIDGEPORT Patent Leather Mfg. Co., Bridgeport, Conn. "Charter Oak."

BYRON & Sons, W. D., Williamsport, Md. "Tanok."

CARTER Co., George R., 1600-20 Kentucky Ave., Connersville, Ind. (Dealers.)

CHARTER OAK—See Bridgeport Patent Leather Mfg. Co.

CLARK Leather Co., 723 Gough St., San Francisco, Cal. "Royal."

CLEVELAND Tanning Co., Jennings & Dennison Aves., S. W., Cleveland, O.

HOWELL & Co., T. P., New & Nuttmann Sts., Newark, N. J. "Lion."

HOWELL-HINCHMAN Co., Middletown, N. Y.

HUDSON Leather Co., 15 Margaretta St., Newark, N. J.

LACKAWANNA Leather Co., Hackettstown, N. J.

LION—See Howell & Co.

OTTAWA Leather Co., Grand Haven, Mich.

PEARCE Bros. Leather Co., 768 Frelinghuysen Ave., Newark, N. J.

RADEL Leather Mfg. Co., Hamburg Place Rd., Newark, N. J.

RASER Tanning Co., Ashtabula, O.

REILLY Co., John, Ave. C & Murray St., Newark, N.J.

REILLY & Son, P., Mott St. & Passaic Ave., Newark, N. J. "Stag."

ROSER & Son, Hermann, Glastonbury, Conn.

ROYAL—See Clark Leather Co.

SHIELDS Bros., Bombay, N. Y.

SMITH Co., Hugh, 210 Central Ave., Newark, N. J.

SMITH & Sons, L. M., 59 Lock St., Newark, N. J.

SMYTH Co., Charles, 240-50 Central Ave., Newark, N. J.

STAG—See Reilly & Son.

STANDARD Leather Co. of Pittsburg, 296 Spring Garden Ave., N. S. Pittsburg, Pa.

STENGEL, Geo., Frelinghuysen & Elizabeth Aves., Newark, N. J.

STENGEL & Rothschild, Kossuth & Berlin Sts., Newark, N. J.

STRAUS & Sons, M., 440 Frelinghuysen Ave., Newark, N. J. "Beaver."

TANOK—See Byron & Sons.

TERWILLIGER-VINCENT Leather Co., 173 Wright St., Newark, N. J.

TURNER & Rutter, 32 Spruce St., New York, N. Y.

WARD & Co., E. S., 414 Frelinghuysen Ave., Newark, N. J.

WING Co., Charles, Amesbury, Mass. (Dealers.)
(See page 399.)

RAWHIDE LACE LEATHER

(For preventing motor hoods or bonnets from rattling)

CHICAGO Rawhide Mfg. Co., 1301 Elston Ave., Chicago, Ill.

DUCKWALL Belting & Hose Co., 516 Capitol Blvd., Indianapolis, Ind.

EAGLE—See Mooney Belting Co.

G & K—See Graton & Knight Mfg. Co.

GAY, Fred E., Thornton, R. I.

GILT EDGE—See Williams & Sons.

GRATON & Knight Mfg. Co., Worcester, Mass. "G & K."
(See page 65.)

HIDE, Leather & Belting Co., Indianapolis, Ind.
(See page 241.)

LADEW Co., Edward R., 82-84 Fulton St., New York, N. Y.

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MODERN equipment, backed by 40 years' experience, has produced our "Quality Line" of automobile specialties:

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The Ideal Leather Substitute

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MOONEY Belting Co., 844 W. Sixth St., Cincinnati, O. "Eagle."

NATIONAL Leather Belting Co., 342 E. 38th St., New York, N. Y.

NATIONAL Leather Mfg. Co., Niles, Mich.

NEW York Leather Belting Co., 51 Beekman St., New York, N. Y.

NORWICH Belt Mfg. Co., Norwich, Conn.

RAHMANN & Co., Geo., 31 Spruce St., New York, N. Y.

RICHMOND Leather Mfg. Co., 2201-07 E. Cary St., Richmond, Va.

SHULTZ Belting Co., 402 Barton St., St. Louis, Mo.

STURGES Co., V. K., 239-12th St., Oakland, Cal.

VICTOR—See Missouri Belting Co.

WEATHERHEAD-THOMPSON Co., Pawtucket, R. I.

WILLIAMS & Sons, I. B., Dover, N. H. "Gilt Edge."

LEGGINGS

MOTORISTS LEGGINGS

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill. "Reliance," "Napoleon," "Tooinone," "Universal," "Boulevard," "Harvard," "National."

B. E. Mfg. Co., 444 Broadway, New York, N. Y.
(See page 97.)

BOULEVARD—See Atlas Specialty Mfg. Co.

COOK & Bro., E. C., 1301-45 Carroll Ave., Chicago, Ill.

HAGERSTOWN Shoe & Legging Co., Hagerstown, Md. "Halco."

HALCO—See Hagerstown Shoe & Legging Co.

HARVARD—See Atlas Specialty Mfg. Co.

NAPOLEON—See Atlas Specialty Mfg. Co.

NATHAN Novelty Mfg. Co., 90G Reade St., New York, N. Y.
(See page 209.)

NATIONAL—See Atlas Specialty Mfg. Co.

PREMIER Auto Novelty Mfg. Co., 375 W. Broadway, New York, N. Y.

RELIANCE—See Atlas Specialty Mfg. Co.

SYRACUSE & Eldridge Glove & Legging Co., 1020 S. Salina St., Syracuse, N. Y.

TOOINONE—See Atlas Specialty Mfg. Co.

UNIVERSAL—See Atlas Specialty Mfg. Co.

WILEY & Son Co., Wm. H., 80 Pliny St., Hartford, Conn.

LEVERS

BRAKE AND GEAR SHIFT LEVERS

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B-T-K Gear & Engine Co., 620-30 S. Elliot St., Muncie, Ind.

BILLINGS & Spencer Co., Hartford, Conn.

BROWN-LIPE Gear Co., Syracuse, N. Y.
(See page 189.)

COTTA Gear Co., 720-30 Sixth St., Rockford, Ill.

COTTA Transmission Co., 814 S. Main St., Rockford, Ill.
(See page 193.)

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

FULLER & Sons Mfg. Co., Kalamazoo, Mich.

HAZARD Motor Mfg. Co., 23 Scherer St., Rochester, N. Y.

JAMESVILLE Mfg. Co., Batavia, N. Y.

KONIGSLOW Mfg. Co., Otto, E. 35th St. & Perkins Ave., Cleveland, O.

OOSTDYK Gear Shifter Co., Goldberg Bldg., Detroit, Mich.

PIPER Machine Co., 560-70 N. Elder Ave., Indianapolis, Ind.

WABASH Gear Works, Tenth & Farrington Sts., Terre Haute, Ind.

WARNER Co., T. W., Kilgore & Perkins Aves., Muncie, Ind.

WARNER Gear Co., Muncie, Ind.
(See page 125.)

WARNER Mfg. Co., Toledo, O.
(See page 243.)

LIFTERS

ONE MAN TOP LIFTERS

(For One Man Tops—See Tops, Automobile)

BROWN, W. H., Rose Bldg., Cleveland, O.

CRARY Co., 650-52 Woodward Ave., Detroit, Mich. "Jiffy."

JIFFY—See Crary Co.

NATIONAL Motor Supply Co., 5606 Euclid Ave., Cleveland, O.

LIGHTERS

ACETYLENE LAMP LIGHTERS

(See also Burners, Special Acetylene Lamp)

ADJUSTABLE Lighter Co., 18 Pearl St., Newton, Mass.

ADVANCE Motor Specialties Co., 503 S. Dearborn St., Chicago, Ill. "Matchless."

AJAX Auto Lighter Co., Lansing, Mich.

AUTO Improvement Co., Fuehring Blk., Indianapolis, Ind.

AUTOMOBILE Lighting Co., Holyoke, Mass "Frary."

BENFORD Mfg. Co., Box H., Mt. Vernon, N. Y. "Monarch."
(See page 305.)

DUNN-RAY Co., Taunton, Mass.

FEESER Co., Frank S., 1102 Prospect St. Indianapolis, Ind. "Superior."

FLASH—See Motor Specialties Co.

FRARY—See Automobile Lighting Co.

G. C. A. Mfg. Co., Pittsfield, Mass. "Grinnell."

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CONTROL LEVERS
MOTORS

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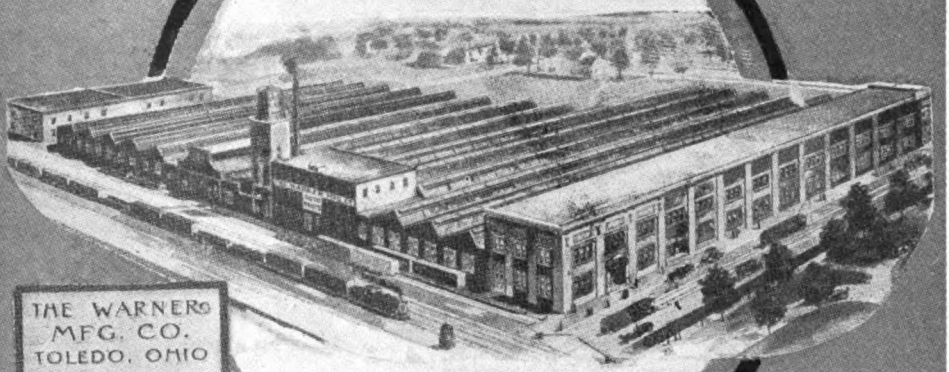

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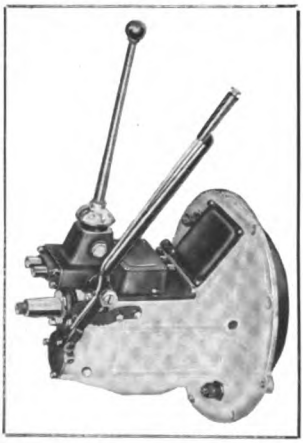
The Warner Efficiency Plant



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HAIGHT Auto Lighter Co., Lansing, Mich.

HOME Light Co., 2108 Dayton St., Chicago, Ill. "U. S."

IDEAL Brass Works, Tenth & Canal Sts., Indianapolis, Ind.

INST Lighter Co., 59 E. Main St., Columbus, O.

MATCHLESS—See Advance Motor Specialties Co.

MONARCH—See Benford Mfg. Co.

MOTOR Specialties Co., Waltham, Mass. "Flash."

PREST-O-LITE Co., 1400 Speedway, Indianapolis, Ind. (See page 515.)

ROUSSEAU, David, Ossining, N. Y.

S. & M. Mfg. Co., Salem, O.

SAFETY Gas Lighter Co., 48 Phoenix Row, Haverhill, Mass.

SEARCHLIGHT Co., 1016 Karpen Blvd., Chicago, Ill.

SUPERIOR—See Feeser Co.

U. S.—See Home Light Co.

ELECTRIC CIGAR LIGHTERS

CENTURY—See Mabeys Electric & Mfg. Co.

COWLES & Co., C., New Haven, Conn. (See page 87.)

HARWOOD, C. F., 516 Atlantic Ave., Boston, Mass.

MABEYS Electric & Mfg. Co., 940 N. Pennsylvania St., Indianapolis, Ind. "Century."

METAL Specialties Mfg. Co., 736-38 W. Monroe St., Chicago, Ill. "Presto."

MORSE, Frank W., 516 Atlantic Ave., Boston, Mass.

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y. (See page 87.)

PRESTO—See Metal Specialties Mfg. Co.

TAYLOR Co., H. D., 101-05 Oak St., Buffalo, N. Y.

OIL LAMP LIGHTERS

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill.

LIGHTS

ELECTRIC DOME LIGHTS

APELCO—See Apple Electric Co.

APPLE Electric Co., Newark, N. J. "Apelco."

CAMPBELL Co., A. S., 284 Commercial St. Boston, Mass. "Cello."

CELLO—See Campbell Co.

COLUMBUS Auto Brass Co., 767 N. Fourth St., Columbus, O.

COWLES & Co., C., New Haven, Conn. (See page 87.)

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill.

GUIDE Motor Lamp Mfg. Co., 11400 W. Madison Ave., Cleveland, O.

HOFACKER Mfg. Co., 555 W. 42d St., New York, N. Y. (See page 235.)

HOLT & Beebee Co., 51 Chardon St., Boston, Mass.

HUDSON-FULTON—See Storage Battery Supply Co.

LIBERTY Cut Glass Works, Egg Harbor City, N. J. (See page 213.)

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y. (See page 87.)

ROSCO—See Rosen & Co.

ROSEN & Co., A. W., 610-14 Broadway, New York, N. Y. "Rosco." (See page 139.)

STORAGE Battery Supply Co., 239 E. 27th St., New York, N. Y. "Hudson-Fulton."

TAYLOR Co., H. D., 101-05 Oak St., Buffalo, N. Y.

VESTA Accumulator Co., 2100 Indiana Ave., Chicago, Ill.

WHITE Mfg. Co., 155 Cannon St., Bridgeport, Conn.

ELECTRIC GAUGE LIGHTS

(See Lamps, Electric Dash)

ELECTRIC HEADLIGHTS

(See Headlights, Electric)

WASH STAND LIGHTS

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ALADDIN—See Smith Mfg. Co.

SMITH Mfg. Co., I. J., 1007 Ave. Q, Brooklyn, N. Y. "Aladdin."

LINING

BODY OR FRAME LINING

GILMER Co., L. H., 52 N. Seventh St., Philadelphia, Pa. (See page 397.)

RUSSELL Mfg. Co., Middletown, Conn.

WESTERN Felt Works, 4115-33 Ogden Ave., Chicago, Ill.

BRAKE LINING

(See Banding, Brake; also Leather, Friction; also Fibre, Hard)

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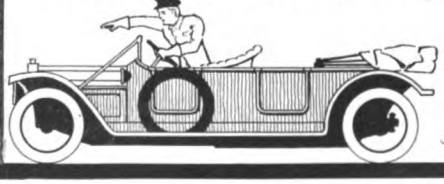

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AMERICAN Linoleum Mfg. Co., 366 Fifth Ave., New York, N. Y.

ARMSTRONG Cork Co., 23d St. & Railroad Ave., Pittsburg, Pa.
(See page 215.)

BLABON Co., Geo. W., 21st St. & Hunting Park Ave., Philadelphia, Pa.

COOK'S Linoleum Co., Trenton, N. J.

LIN-RHUBER—See Nairn Linoleum Co.

MONARCH Rubber & Oil Cloth Co., Drexel Bldg., Philadelphia, Pa.

NAIRN Linoleum Co., Newark, N. J. "Lin-Rhuber."
(See page 247.)

POTTER, Sons & Co., Thomas, Lafayette Bldg., Philadelphia, Pa.

RINGWALT Linoleum Works, 50 Union Sq., New York, N. Y.

LOADERS

TRUCK LOADERS

ECLIPSE—See Galion Iron Works & Mfg. Co.

GALION Iron Works & Mfg. Co., Galion, O. "Eclipse."

LINK-BELT Co., Chicago, Ill.
(See apge 363.)

LOCKS

AUTOMOBILE LOCKS

(For Locking Steering Gears or Gear Levers; For Lock Switches—See Switches, Electric Lock; For Lock Valves—See Valves, Gasoline Lock)

AUTOMOBILE Accessories Co., 623A Ellicott Sq., Buffalo, N. Y.
(See page 247.)

B. & W.—See Universal Mfg. Co.

BACKUS Novelty Co., 612 Water St., Smethport, Pa.

BENHAM—See Shroyer & Co.

BRACELET Auto Lock Co., 32 N. Clark St., Chicago, Ill.

BREAKSTONE, S., 1436-38 S. Michigan Ave., Chicago, Ill. "Watch Dog."

BRIDGES—See Cochran Pipe Wrench Mfg. Co.

COCHRAN Pipe Wrench Mfg. Co., 7800 Woodlawn Ave., Chicago, Ill. "Bridges."

CONNECTICUT Telephone & Electric Co., Meriden, Conn.
(See page 401.)

COULS—See Pneumatic Spring & Lock Co.

FORD Lock Co., 1042 S. Olive St., Los Angeles, Cal.

GENERAL Utility Co., 1326-30 Ogden St., Philadelphia, Pa. "Parker."

HILL Pump Valve Co., 18-20 E. Kinzie St., Chicago, Ill.

LAWRENCE Specialty Co., Boston, Mass.

MABEYS Electric & Mfg. Co., 940 N. Pennsylvania St., Indianapolis, Ind.

MILLER Hardware Co., T. T., 30-32 N. Fourth St., Easton, Pa.

PARKER—See General Utility Co.

PNEUMATIC Spring & Lock Co., 134 St. Antoine St., Detroit, Mich. "Couls."

ROBE Lock Co., 529-31 Linden St., Oakland, Cal.

ROCHESTER Safety Lock Co., 530 Main St., Rochester, Ind.

SHROYER & CO., G. W., 102-06 Main St., N. Dayton, O. "Benham."

UNIVERSAL Mfg. Co., Racine, Wis. "B. & W."

WATCH DOG—See Breakstone, S.

WELCH Bros., Pontiac, Mich.

YALE & Towne Mfg. Co., 9 E. 40th St., New York, N. Y.

CABINET AND PADLOCKS

AMERICAN Keyless Lock Co., 628 W. Jackson Blvd., Chicago, Ill.

CORBIN Cabinet Lock Co., New Britain, Conn.
(See page 247.)

EAGLE Lock Co., Terryville, Conn.

FRAIM Lock Co., E. T., Park Ave. & Jefferson St., Lancaster, Pa.

JUNKUNE Bros., 983 W. 71st St., Chicago, Ill.

SARGENT & Co., Water & Wallace Sts., New Haven, Conn.

SLAYMAKER Lock Mfg. Corp., 808-70 First St., Lancaster, Pa.

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DOOR LOCKS

ÆTNA Brass Mfg. Co., 3870-90 Hamilton Ave., Cleveland, O.

AMERICAN Brass Novelty Co., Grand Haven, Mich.

APPLEBY & Co., W. H., 224 N. Desplaines St., Chicago, Ill.

BRAINERD Mfg. Co., East Rochester, N. Y.

COWLES & Co., C., New Haven, Conn.
(See page 87.)

DOUGLAS & Lomason Co., Detroit, Mich.
(See page 211.)

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

OCHSNER & Sons Co., A., 1060 State St., New Haven, Conn.

PARSONS Mfg. Co., 21st & Fort Sts., Detroit, Mich.

SMITH & Co., Jos. N., Detroit, Mich.
(See page 547.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn

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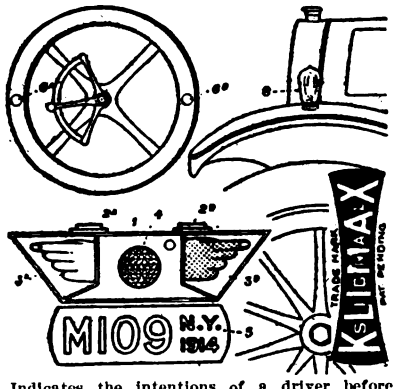

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(See also Fittings, Top)

ANCHOR—See North & Judd Mfg. Co.

ATTWOOD Brass Works, Scribner Ave. & Bowery St., Grand Rapids, Mich. (See page 249.)

COWLES & Co., C., New Haven, Conn. (See page 87.)

CRANDAL, Stone & Co., Binghamton, N. Y. (See page 369.)

DESOCO—See Detroit Socket Co.

DETROIT Socket Co., 814 Jefferson Ave., W., Detroit, Mich. "Desoco."

DOUGLAS & Lomason Co., Detroit, Mich. (See page 211.)

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco." (See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

JONAH & George, Merrimac, Mass.

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

NORTH & Judd Mfg. Co., New Britain, Conn. "Anchor."

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y. (See page 87.)

SMITH & Co., Jos. N., Detroit, Mich. (See page 547.)

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. (See page 293.)

WIENER-BARNET Co., 312-28 Adams St., Newark, N. J. (See page 249.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

LUBRICANTS

OILS AND GREASES

(See Oils, Lubricating; also Greases, Cup and Gear)

LUBRICATORS

HAND LUBRICATORS OR OIL PUMPS

COX Brass Mfg. Co., Albany, N. Y. (See page 357.)

ESSEX Brass Co., G. B., 480-86 Franklin St., Detroit, Mich.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. (See page 83.)

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O.

MECHANICAL LUBRICATORS OR OIL PUMPS

(Engine driven Oil Pumps)

BOSCH Magneto Co., 223 W. 46th St., New York, N. Y.

DETROIT Lubricator Co., Detroit, Mich. (See page 231.)

HANCOCK Mfg. Co., 770 Henry St., Charlotte, Mich.

KINSEY Mfg. Co., Toledo, O. "Kinwood."

KINWOOD—See Kinsey Mfg. Co.

LAVIGNE Mfg. Co., 625-41 Commonwealth Ave., Detroit, Mich.

LEE Co., Wm. O., Port Huron, Mich. (See page 113.)

LIPMAN Mfg. Co., 211 Pleasant St., Beloit, Wis.

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O.

McCORD Mfg. Co., Detroit, Mich. (See pages 178 and 179.)

MADISON-KIPP Lubricator Co., Madison, Wis.

MANZEL Bros. Co., 320 Babcock St., Buffalo, N. Y. (See page 321.)

NEELY Mfg. Co., 829 Wells St., Chicago, Ill.

OSGOOD Lubricator Co., J. L., 45 Pearl St., Buffalo, N. Y.

PEDERSEN Lubricator Co., 636 First Ave., New York, N. Y.

RICHARDSON-PHENIX Co., 122-28 Reservoir Ave., Milwaukee, Wis.

WEISS, L. T., 293 Taaffe Pl., Brooklyn, N. Y. (See page 249.)

OIL AND GREASE CUP LUBRICATORS

(See Cups, Oil and Grease)

PRESSURE LUBRICATORS

ESSEX Brass Co., G. B., 480-86 Franklin St., Detroit, Mich.

KRAHN Mfg. Co., 588 Clinton St., Milwaukee, Wis.

PEDERSEN Lubricator Co., 636 First Ave., New York, N. Y.

SHERWOOD Mfg. Co., 1702-16 Elmwood Ave., Buffalo, N. Y.

WILKINSON Co., Wm. H., West Medway Mass.

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HERMETIC—See Cryder & Co.

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CARRIER Lumber & Mfg. Co., Sardis, Miss.

DARLING Lumber Co., J. W., Cincinnati, O.

EVANS Lumber Co., G. H., Chattanooga, Tenn.

GREBLE-SINE Lumber Co., Peoples Gas Bldg., Chicago, Ill.

HIMMELBERGER-HARRISON Lumber Co., Cape Girardeau, Mo.

INTERSTATE Lumber Co., The Arcade, Cleveland, O.

LAMB-FISH Lumber Co., Charleston, Miss.

LEONARD, H. R., Seaboard Bank Bldg., Norfolk, Va.

LOVE, Boyd & Co., ft. S. Second St., Nashville, Tenn.

LUEHRMANN Hardwood Lumber Co., Chas. F., 148 Carroll St., St. Louis, Mo.

MOORE & McFerren, Memphis, Tenn.

NEW River Lumber Co., Union Trust Bldg., Cincinnati, O.

PAEPKE-LEICHT Lumber Co., 111 W. Washington St., Chicago, Ill.

SHIELS & Co., Charles F., McLane Ave. & Gest St., Cincinnati, O.

SULLIVAN & Co., T., Niagara & Arthur Sts., Buffalo, N. Y.

TAUSSIG, L. J., Commercial Bldg., St. Louis, Mo.

THREE States Lumber Co., Memphis, Tenn.

MACHINE WORK

SPECIAL MACHINE WORK TO ORDER

(See also Screw Machine Products)

ADAPT Machinery Co., 1610 Wabash Ave., Chicago, Ill.

ADVANCE Machine Co., 654-58 Franklin St., Detroit, Mich.

ADVANCE Mfg. Co., Racine, Wis.

ÆTNA Brass Mfg. Co., 3870-90 Hamilton Ave., Cleveland, O.

ALEXANDER & Cox Co., Ogden & Western Aves., Chicago, Ill.

AMERICAN Air Compressor Co., 1523-31 W. Fort St., Detroit, Mich.

AMERICAN Brass & Iron Co., Detroit, Mich.
(See page 211.)

AMERICAN Car & Ship Hardware Mfg. Co., Dept. T, New Castle, Pa.
(See page 167.)

AMERICAN Die & Tool Co., Reading, Pa.
(See page 191.)

AMERICAN & British Mfg. Co., 718 Crescent Ave., Bridgeport, Conn.

ASHLEY Machine Works, 724 University Ave., Rochester, N. Y.
(See page 251.)

ATLAS Brass Foundry Co., 980-90 S. Front St., Columbus, O.

ATTWOOD Brass Works, Scribner Ave. & Bowery St., Grand Rapids, Mich.
(See page 249.)

AUTOPARTS Mfg. Co., Detroit, Mich.

BILLINGS & Spencer Co., Hartford, Conn.

BLACK & Decker Mfg. Co., 109-15 S. Calvert St., Baltimore, Md.

BLAIR Tool & Machine Works, 521 Greenwich St., New York, N. Y.

BLAKE & Johnson Co., Waterbury, Conn.

BLANCHARD Machine Co., 64 State St., Cambridge, Mass.

BRASS & Aluminum Foundry & Machine Co., 364 Trombly St., Detroit, Mich.

BRIDGEPORT Engineering Co., Bridgeport, Conn.

BUDA Co., Harvey, Ill.

BULTMAN Co., F. H., 2108 Superior Viaduct, Cleveland, O.

BUNTING Brass & Bronze Co., 737 Spencer St., Toledo, O.
(See page 423.)

CASSADY-FAIRBANK Mfg. Co., 6106-30 La Salle St., Chicago, Ill.

CHESTERMAN & Streeter, 125 N. Seventh St., Philadelphia, Pa.

CHICAGO-RACINE Aluminum, Brass & Iron Works, 224-30 W. Huron St., Chicago, Ill.

CLARK Novelty Co., 380 Exchange St., Rochester, N. Y.

CLEVELAND Ball Bearing Co., Cleveland, O.
(See page 409.)

CLIMAX Machinery Co., 143-63 E. Morris St., Indianapolis, Ind.

CONOVER-OVERKAMP Machine & Tool Co., 841 W. Germantown St., Dayton, O.

COOPER Flexible Transmission Co., Eighth Ave. & 18th St., Brooklyn, N. Y.

CURRIE & Son. J. B., 72 Adams St., Brooklyn, N. Y.

DE CAMP & Sloan Mfg. Co., 420 Ogden St., Newark, N. J.

DETLAFF, A. J., 121 Champlain St., Detroit, Mich.

DETROIT Gear & Machine Co., Detroit, Mich.
(See page 185.)

DETROIT Motor Casting Co., 299-303 Beaufait Ave., Detroit, Mich.

DIAMOND Chain & Mfg. Co., 231 W. Georgia St., Indianapolis, Ind.

DIEBOLD Products Co., 5333-37 St. Clair Ave., Cleveland, O.

DITWILER Mfg. Co., Galion, O.

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

EASTERN Machine & Stamping Co., 15 Wickenden St., Providence, R. I.

EASTON Contracting & Machine Co., 39 N. Sitgreaves St., Easton, Pa.

EDWARDS Co., B. V., 60 Shipman St., Newark, N. J.

ELECTRICAL Engineering & Storage Battery Co., Hume-Mansure Bldg., Sandy Hook, Conn.

FARMER Mfg. Co., Fordyce & Marston Sts., Detroit, Mich.
(See page 643.)

FERRO Machine & Foundry Co., 47 Hubbard Ave., Cleveland, O.

Complete Index to Classification appears on Pages 8 to 26.

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MACHINE WORK (Continued)

SPECIAL MACHINE WORK TO ORDER (Continued)

FORE River Shipbuilding Corp., Quincy, Mass.

FORT Dearborn Mfg. Co., 1574-80 Crossing St., Chicago, Ill.

FRIES & Co., Buffalo, N. Y.

FRONTIER Engineering Co., 816-86 Fort St., W., Detroit, Mich.

FROST Gear & Forge Co., Jackson, Mich.
(See page 187.)

FULLER & Sons Mfg. Co., Kalamazoo, Mich.

FULTON Mfg. Co., Erie, Pa.

GARRIGUS Machine Co., C. G., 151 Riverside Ave., Bristol, Conn.

GARVIN Machine Co., Spring & Varick Sts., New York, N. Y.

GEIER Co., P. A., 5112 St. Clair Ave., E., Cleveland, O.

GILL & Sons Forge & Machine Works, P. H., Lorraine & Otsego Sts., Brooklyn, N. Y.
(See page 175.)

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O.
(See page 81.)

GOETZ Co., 1802 Clybourn Ave., Chicago, Ill.

GOODSPEED-DETROIT Mfg. Co., 272-80 Harper Ave., Detroit, Mich.

GRANT Mfg. & Machine Co., Bridgeport, Conn.

GREENHALGH Engine & Machine Works, G. H., 550-52 Central Ave., Newark, N. J.

HARTFORD Machine Screw Co., Hartford, Conn.
(See page 301.)

HAWTHORNE Mfg. Co., 38 Spruce St., Bridgeport, Conn.

HILES & Co., C. A., 14th St. & Western Ave., Chicago, Ill.

HOUPERT Machine Co., 351-55 W. 52d St., New York, N. Y.

HULL Mfg. Co., Lansing, Mich.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

INDIANAPOLIS Tool & Mfg. Co., Indianapolis, Ind.

INDUSTRIAL Electric Mfg. Co., Detroit, Mich.

JACOBSON Machine Mfg. Co., Warren, Pa.
(See page 345.)

JOHNSTON & Jennings Co., 877 Addison Rd., Cleveland, O.

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

KERMATH Mfg. Co., 45 Fort St. E., Detroit, Mich.

KIDDER-OSWALD Co., Dayton, O.

KONIGSLOW Mfg. Co., Otto, E. 35th St. & Perkins Ave., Cleveland, O.

KRAHN Mfg. Co., 588 Clinton St., Milwaukee, Wis.

LEE Co., Wm. O., Port Huron, Mich.
(See page 113.)

LEWIS Spring & Axle Co., Jackson, Mich.

LIGGETT Spring & Axle Co., Monongahela, Pa.
(See page 129.)

LIMERICK Co., J. Arthur, 960 N. Howard St., Baltimore, Md.
(See page 369.)

LINK-BELT Co., Chicago, Ill.
(See page 363.)

LONG Machine Works, Adam A., Ave. E & St. Paul St., Rochester, N. Y.

LYCOMING Foundry & Machine Co., Williamsport, Pa.
(See page 635.)

MASSNICK-PHIPPS Mfg. Co., 1091 Champlain St., Detroit, Mich.

METROPOLITAN Mfg. Co., 12th St. & G. T. R. R., Detroit, Mich.

MILHOLLAND Machine Co., W. K., 29th & Canal Sts., Indianapolis, Ind.

MODERN Machinery Co., Monroe & Fifth Sts., Wilmington, Del.

MOORE & Co., 301 W. Grand Ave., Chicago, Ill.

MURRAY Machine Works, 1924 Wabansia Ave., Chicago, Ill.

NATIONAL Cycle & Mfg. Co., Bay City, Mich.

NATIONAL Engineering Co., Saginaw, Mich.
(See page 533.)

NATIONAL Sewing Machine Co., Belvidere, Ill.

NATIONAL Stamping & Electric Works, 410-26 Clinton St., Chicago, Ill.

NEW England Gear Works, 100 Purchase St., Boston, Mass.

NEWARK Stamping Co., Newark, O.

NILSON-MILLER Co., 13th & Hudson Sts., Hoboken, N. J.

OBENBERGER Drop Forge Co., Milwaukee, Wis.
(See page 525.)

OBERDORFER Brass Co., M. L., 304 E. Water St., Syracuse, N. Y.

OFFENHAEUSER & Dotsch, 41 Beekman Ave. (N. Tarrytown), Tarrytown, N. Y.

PETERS Machine & Mfg. Co., Whitney Power Bldg., Cleveland, O.

PIONEER Brass Works, Indianapolis, Ind.
(See page 101.)

PIPER Machine Co., 560-70 N. Elder Ave., Indianapolis, Ind.

PROSSER Engineering Co., 2106 W. Superior Ave., Cleveland, O.

PROVIDENCE Engineering Works, 521 S. Main St., Providence, R. I.

PURITAN Machine Co., 409-21 Lafayette Blvd., Detroit, Mich.

ROSS Machine Co., 208 S. Fourth St., La Fayette, Ind.

RUSSEL Wheel & Foundry Co., Detroit, Mich.

SAYRE Stamping Co., Sayre, Pa.

SCALLAN & Co., W. E., 1123-25 Gest St., Cincinnati, O.

SCHATZ Mfg. Co., 17 Fairview Ave., Poughkeepsie, N. Y.

SCOVILL Mfg. Co., 222 W. Lake St., Chicago, Ill.
(See page 349.)

SELIK Bros., 254-56 Meldrum Ave., Detroit, Mich.

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SUPERIOR AUTOMOBILE PARTS

ACCURATELY MADE

PROMPT DELIVERIES

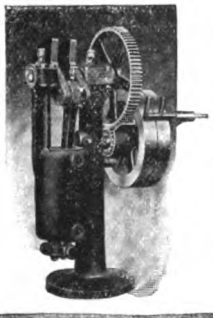
PISTONS
PISTON RINGS
PISTON PINS
HARDENED AND GROUND PIECES
TIMING GEARS
TRANSMISSION GEARS
CYLINDERS

CONSISTENT PRICES

SPECIALIZED PRODUCTION

SPACKE Automobile Machine Parts, made to specifications, are the result of years of effort devoted to this work, and to the furnishing in quantity of better and cheaper parts.

By their use you will obtain a better product, save money, and be rid of troublesome manufacturing details.



If in the market for quantity lots, it will pay you to send us your inquiries and blue prints for estimate.

AIR COMPRESSORS

A full line of Air Compressors and accessories for automobile garage use. Single and three-cylinder styles—belt and motor drive.

No modern garage is complete without this equipment. *Send for catalog and prices.*

THE F.W. SPACKE MACHINE CO

INDIANAPOLIS, IND., U.S.A.

NO. 31-A

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MACHINE WORK (Continued)

SPECIAL MACHINE WORK TO ORDER (Continued)

SHIMER & Sons, Samuel J., Milton, Pa.

SIER-BATH Co., 143 W. 54th St., New York, N. Y.
(See page 437.)

SLOAN & Chace Mfg. Co., Sixth Ave. & 13th St., Newark, N. J.

SMITH Mfg. Co., Philip, Sidney, O.

SPACKE Machine Co., F. W., Indianapolis, Ind.
(See page 253.)

STANDARD Engineering Works, 90 Exchange St., Pawtucket, R. I.

STANDARD Mfg. Co., 990 Housatonic Ave., Bridgeport, Conn.

SUPERIOR Machine & Engineering Co., 51-53 Fort St., E., Detroit, Mich.

SWOPE-McCRACKEN Co., Elks Temple, Detroit, Mich.

T. C. M. Mfg. Co., Hunterdon & First Sts., Harrison, N. J.

TAFT-PEIRCE Mfg. Co., Woonsocket, R. I.

TANNER-HOWER Mfg Co., Akron, O.
(See page 177.)

TURNER & Moore Mfg. Co., 54 Champlain St., Detroit, Mich.

UNION Elevator & Machine Co., 215-17 W. Ontario St., Chicago, Ill.

UNIVERSAL Mfg. Co., Racine, Wis.

UNIVERSAL Telegraphic Co., Baltimore, Md.

VOELKNER & Harry Mfg. Co., 282-92 Woodbridge St., E. Detroit, Mich.

WADE Machine Co., 817 Albany St., Boston, Mass.

WALKER Co., H. J., 40 Champlain St., Detroit, Mich.

WARNER Bros. Machine Works, High & Howard Sts., Muncie, Ind.

WEISS, L. T., 293 Taaffe Pl., Brooklyn, N. Y.
(See page 249.)

WEST & Dodge, 384 Atlantic Ave., Boston, Mass.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

WESTERN Gear & Mfg. Co., Frederick Ave., & G. T. R. R., Detroit, Mich.

WESTINGHOUSE Machine Co., (E. Pittsburg), Pittsburg, Pa.

WILCOX-McKIM Co., Saginaw, Mich.

WYMAN & Gordon Co., Worcester, Mass.
(See Back Bone.)

MAGNETOS

IGNITION MAGNETOS AND DYNAMOS

BERLING—See Ericsson Mfg. Co.

BOSCH Magneto Co., 223 W. 46th St., New York, N. Y.

BRIGGS Magneto Co., Elkhart, Ind.

CONNECTICUT Telephone & Electric Co., Meriden, Conn.
(See page 401.)

DOW Mfg. Co., 131 Adams St., Braintree, Mass.

EISEMANN Magneto Co., 32-33d St., Brooklyn, N. Y.
(See page 255.)

ERICSSON Mfg Co., 1121 Military Rd., Buffalo, N. Y. "Berling."

HEINZE Electric Co., Lowell Mass.
(See page 479.)

HERZ & Co., 245 W. 55th St., New York, N. Y. (Importers.)
(See page 311.)

K-W Ignition Co., 2833 Chester Ave., Cleveland, O.

KINGSTON—See Kokomo Electric Co.

KOKOMO Electric Co., 1415 Webster St., Kokomo, Ind. "Kingston."

MARBURG Bros., 1790 Broadway, New York, N. Y. (Importers.) "Mea."
(See page 481.)

MEA—See Marburg Bros.

NATIONAL Coil Co., Lansing, Mich.

REMY Electric Co., Anderson, Ind.
(See page 427.)

SIMMS Magneto Co., Bloomfield, N. J.

SPLITDORF Electrical Co., Newark, N. J.
(See page 161.)

SWISS Magneto Co., 3021-23 Michigan Ave., Chicago, Ill.

MAGNETS

PERMANENT MAGNETS

(For Magnetos)

KREFELD Steel Co., 50 Church St., New York, N. Y. (Importers.)

LINDENBERG Steel Co., 90 West St., New York, N. Y. (Importers.)

MANIFOLDS

INTAKE AND EXHAUST MANIFOLDS

(Brazed and Welded Manifolds. For Cast Manifolds—See Castings)

A-Z Co., 530 W. 56th St., New York, N. Y.

AMERICAN Tube Products Co., Euclid Ave., E., & Grand Trunk Ry., Detroit, Mich.

DIAMOND Mfg. Co., Detroit, Mich.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

IRELAND & Matthews Mfg. Co., 51-79 Iron St., Detroit, Mich.

JACOBS Co., F. L., 451 Guoin St., Detroit, Mich.

MILWAUKEE Valve Co., 139 Burrell St., Milwaukee, Wis.

NATIONAL Pipe Bending Co., River & Lloyd Sts., New Haven, Conn.

SANFORD Mfg. Co., F. C., Bridgeport, Conn.
(See page 511.)

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EISEMANN

Indicative of the determination of the Eisemann Magneto Company to take care of American manufacturers without delay, announcement is made of another increase of the present large factory.

Last summer, long before hostilities broke out in Europe, an increase of more than a third additional space was arranged for. This has just been occupied with full equipment for manufacturing. But with recent developments even this space was insufficient for us to keep up with growing demands. So we have just started upon an even larger increase of manufacturing space and facilities which we will occupy within a very few weeks.

While some of this demand for Eisemann instruments has been occasioned by war conditions, that have not affected our products, the greatest proportion of it is a natural growth as a result of the realization on the part of car makers, of an unquestioned supremacy of Eisemann products from a standpoint of efficiency, durability and dependability.

Additions to Eisemann Factory

The
Eisemann Magneto Co.

Sales and General Offices
32-33d St., Brooklyn, N. Y.

New York
245 W. 55th St.
Indianapolis, Ind.
415-417 N. Capitol Ave.
Detroit, Mich.
802 Woodward Ave.

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MANIFOLDS (Continued)

INTAKE AND EXHAUST MANIFOLDS (Continued)

STANDARD Metal Mfg. Co., Newark, N. J. (See page 219.)

STANDARD Metalwork Co., 22-40 Prospect St., Thompsonville, Conn.

STANDARD Tool & Mfg. Co., 72 Champlain St., Detroit, Mich.

STANDARD Welding Co., Cleveland, O. (See Book Mark.)

UNITED Wire & Supply Co., 109 Summer St., Providence, R. I.

WIENER-BARNET Co., 312-28 Adams St., Newark, N. J. (See page 249.)

WORCESTER Pressed Steel Co., Worcester, Mass. (See page 157.)

MANUFACTURERS AGENTS

(This is a list of Manufacturers Agents who advertise in this publication.)

LYON, Edward F., 1003 Woodward Ave., Detroit, Mich. (See page 483.)

MAPS

ROAD MAPS

AUTOMOBILE Blue Book Publishing Co., 243 W. 39th St., New York, N. Y. (See page 313.)

BALDWIN Mfg. Co., 143 Federal St., Boston, Mass.

CALDWELL, Henry, 137 E. 16th St., New York, N. Y.

CHADWICK, L. S., 7309-609 Platt Ave., Cleveland, O.

CLASON Map Co., 1515 Tremont Pl., Denver, Colo.

DOVER Route Indicator Co., Occoquan, Va.

FARMER & Co., Silas, 29-31 Monroe Ave., Detroit, Mich.

HUEBINGERS—See Iowa Publishing Co.

IOWA Publishing Co., Fifth St. & Grand Ave., Des Moines, Ia. "Huebingers."

MENDENHALL, C. S., Race St., & Opera Pl., Cincinnati, O.

SCARBOROUGH Co., 333 N. Delaware Ave., Indianapolis, Ind.

WALKER Lithograph & Publishing Co., 400 Newbury St., Boston, Mass.

MATTING

ALUMINUM MATTING

ALUMINUM Co. of America, Pittsburg, Pa.

METALLIC Automobile Matting Co., Rochester, N. Y. "Pyrma." (See page 495.)

PYRMA—See Metallic Automobile Matting Co.

MATS

COCOA MATS

DARRAGH & Small, 177 Water St., New York, N. Y.

HEYWOOD Bros. & Wakefield Co., 174 Portland St., Boston, Mass.

KEMPF & Son, Wm. F., 1027-33 N. Fourth St., Philadelphia, Pa.

McCABE & Bro., Benj., 37 E. 13th St., New York, N. Y.

RANCOCAS Mills, Trenton, N. J.

RUBBER MATS

ACME Rubber Mfg. Co., Trenton, N. J.

BOSTON Belting Co., 84 Linden Park St., Boston, Mass.

BOSTON Woven Hose & Rubber Co., 110 Portland St., Cambridge, Mass. "Lenox," "Tiger."

BOWERS Rubber Works, 68-70 Sacramento St., San Francisco, Cal.

CINCINNATI Rubber Mfg. Co., Cincinnati, O. (See page 369.)

COMBINATION Rubber Mfg. Co., Bloomfield, N. J.

DIAMOND Rubber Co., Akron, O.

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J.

ESSEX Rubber Co., Trenton, N. J.

FEDERAL Rubber Mfg. Co., Milwaukee, Wis.

GOODRICH Co., B. F., Akron, O.

HAMILTON Rubber Mfg. Co., Trenton, N. J. (See page 359.)

HOME Tire Co., Trenton, N. J.

LENOX—See Boston Woven Hose & Rubber Co.

MANHATTAN Rubber Mfg Co., Passaic, N. J.

MECHANICAL Rubber Co., C. & P. & Nickel Plate R. R., Cleveland, O.

MILFORD Rubber Works, Milford, Ill.

MINERALIZED Rubber Co., 165 Chambers St., New York, N. Y.

MONARCH Rubber & Oil Cloth Co., Drexel Bldg., Philadelphia, Pa.

NEW Jersey Car Spring & Rubber Co., Wayne & Brunswick Sts., Jersey City, N. J.

NEW York Belting & Packing Co., 91 Chambers St., New York, N. Y.

PENNSYLVANIA Rubber Co., Jeannette, Pa.

THERMOID Rubber Co., Trenton, N. J. (See page 57.)

TIGER—See Boston Woven Hose & Rubber Co.

VICTOR Rubber Co., Springfield, O.

VOORHEES Rubber Mfg. Co., 18-46 Bestwick Ave., Jersey City, N. J. (See page 291.)

STEEL MATS

WORTH Wire Works, Kokomo, Ind.

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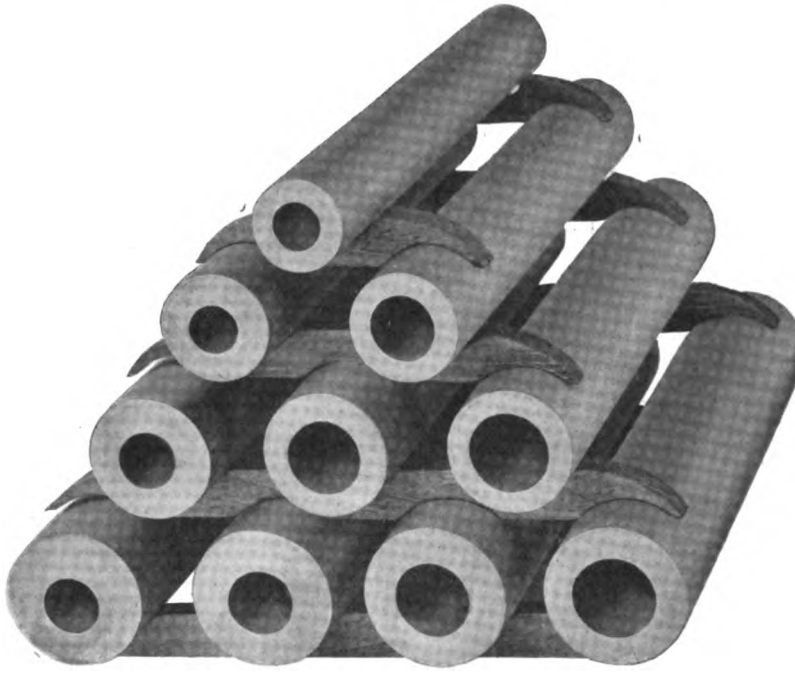
Eureka Cored and Solid Bars

PHOSPHOR BRONZE BUSHINGS



The sizes most commonly used are:

O. D. Inches	I. D. Inches	Average Wt. Lbs.
3/4	Solid	1 3/4
1	1/2	2 1/4
1 1/4	5/8	3 1/2
1 3/8	3/4	4
1 1/2	3/4	5
1 5/8	7/8	5 1/2
1 3/4	1	6 1/4
2	1 1/8	8 1/4
2 1/4	1 3/8	10
2 1/2	1 5/8	11

We furnish Solid Bars of any diameter and Cored Bars of any size without additional charge for Patterns.

The durability and antifriction qualities of Eureka Bronze are unexcelled. It is the most successful metal for bearing purposes on the market, giving the greatest resistance to wear, and the least amount of friction. It increases the efficiency and life of the bearings.

THE EUREKA COMPANY, North East, Penn'a.

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MATS (Continued)

STEP OR RUNNING BOARD MATS

KAR KLEAN—See Specialty Mat Co.

KOKLIP—See Wilson & Co.

MOSLER & Co., A. R., Box M, Mt. Vernon, N. Y.
(See page 303.)

SPECIALTY Mat Co., 1 First St., Troy, N. Y. "Kar Klean."

WILSON & Co., F. Cortez, 323 W. Lake St., Chicago, Ill. "Koklip."

METALS

BEARING METALS

A. B. C. Castings Co., 6515 Carnegie Ave., S. E., Cleveland, O. "Meteor."

ACORN—See Cadman Mfg. Co.

ADAMANT—See Magnolia Metal Co.

ÆTNA Brass Mfg. Co., 3870-90 Hamilton Ave., Cleveland, O.

ALUMINUM Castings Co., 6217 Carnegie Ave., Cleveland, O. "Lynux."
(See page 99.)

AMERICAN Bronze Co., 140-80 Non-Gran Blvd., Berwyn, Pa. "Non-Gran."
(See page opposite Inside Front Cover.)

AMERICAN Bronze Co., 90-108 Arthur St., Buffalo, N. Y. "Grainless."

AMERICAN Manganese Bronze Co., 99 John St., New York, N. Y. "Spare's."

ATKINSON Co., Rochester, N. Y. "Superior," "Plata."
(See page 261.)

AUTO-CRAT—See Syracuse Smelting Works.

AZALEA—See Vanadium Metals Co.

BESLY & Co., Charles H., 118-24 N. Clinton St., Chicago, Ill. "Helmet."

BIRKENSTEIN & Sons, S., 387-99 W. Ontario St., Chicago, Ill.
(See page 477.)

BLAKE, Edwin J., 565 Windsor St., Hartford, Conn.

BLATCHFORD Co., E. W., 230 N. Clinton St., Chicago, Ill.

BRASS & Aluminum Foundry & Machine Co., 364 Trombly St., Detroit, Mich.

BRIDGEPORT—See Monumental Bronze Co.

BUNTING Brass & Bronze Co., 737 Spencer St., Toledo, O.
(See page 423.)

CADMAN Mfg. Co., A. W., 2814-16 Smallman St., Pittsburg, Pa. "Acorn."

CARSON-ROWELL Co., Appleton, Wis.

COLORADO Lead Works Co., 1516 Blake St., Denver, Colo.

COLUMBIA Smelting & Refining Works, 365-67 West St., New York, N. Y.

COLUMBIAN Brass Foundry, Freeport, N. Y. "Excello."

COX Brass Mfg. Co., Albany, N. Y.
(See page 357.)

CRAMP & Sons Ship & Engine Building Co., William, Philadelphia, Pa. "Parsons."
(See page 261.)

DAMASCUS Bronze Co., Pittsburg, Pa.

DAWSON Hardened Copper Co., S. R., 42 Broadway, New York, N. Y.

EDNA Brass Mfg. Co., 525-33 Reading Rd., Cincinnati, O.

ELECTRIC Smelting & Aluminum Co., Lockport, N. Y.

ELEPHANT—See Phosphor Bronze Smelting Co.

EMPIRE Metal Co., Syracuse, N. Y. "Premier," "Triumph."

EUREKA Brass Co., 2210-18 Scott Ave., St. Louis, Mo

EUREKA Co., North East, Pa.
(See page 257.)

EXCELLO—See Columbian Brass Foundry.

FAHRIG Metal Co., 34 Commerce St., New York, N. Y.
(See page 283.)

FRICTIONLESS Metal Co., Chattanooga, Tenn.

GARDINER Metal Co., 1356-64 W. Lake St., Chicago, Ill.

GENERAL Aluminum & Brass Mfg. Co., E. Grand Blvd. & St. Aubin Ave., Detroit, Mich.
(See pages 105 and 261.)

GERMANN Bronze Co., 355 W. 19th St., Erie, Pa.
(See page 291.)

GRAHAM & Co., James, 293 Wooster St., New Haven, Conn.
(See page 209.)

GRAINLESS—See American Bronze Co.

GREAT Western Smelting & Refining Co., 41st & Wallace Sts., Chicago, Ill.

HARPER, Thomas, 139 Lafayette St., New York, N. Y. "Hi-Servis."

HECLA—See Paulson & Son.

HELMET—See Besly & Co.

HENNING & Sons, V., 314-36 Belmont Ave., Brooklyn, N. Y.

HI-SERVIS—See Harper, Thomas.

HOWARD Metal Co., Second & Canal Sts., Reading, Pa.

HOYT Metal Co., 300 N. Broadway, St. Louis, Mo. "Trojan."
(See page 105.)

KAHN Bros., 775-97 Humboldt St., Brooklyn, N. Y.

LEHMAN Bros., 401-05 Jefferson St., Hoboken, N. J.

LIGHT Mfg. & Foundry Co., Pottstown, Pa.
(See page 287.)

LISSBERGER & Son, Marks, 281 Borden Ave., Long Island City, N. Y.

LUMEN Bearing Co., Buffalo, N. Y.
(See pages 195 and 259.)

LYNUX—See Aluminum Castings Co.

McGILL Metal Co., Valparaiso, Ind.

MAGNOLIA Metal Co., 113-15 Bank St., New York, N. Y. "Adamant."

MERCHANT & Evans Co., Philadelphia, Pa. "S. A. E."

METEOR—See A. B. C. Castings Co.

MOGUL Metal Co., Detroit, Mich.
(See page 107.)

MONUMENTAL Bronze Co., 354 Howard St., Bridgeport, Conn. "Bridgeport."

MORE-JONES Brass & Metal Co., 3132-44 N. Broadway, St. Louis, Mo.

MUZZY-LYON Co., Detroit, Mich.
(See page 107.)

NATIONAL Lead Co., New York, N. Y.
(See page 353.)

NEW Era Mfg. Co., Kalamazoo, Mich.

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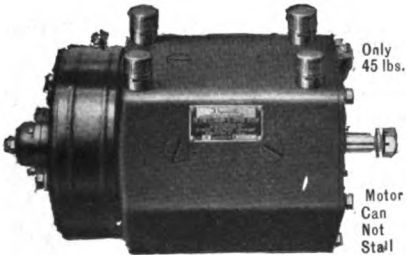
Dyneto

REGISTERED TRADE MARK

Single Unit Electric Starting and Lighting System



A Combined Motor-Generator

As a motor, it is naturally more powerful than the smaller motor in a two-unit system; as a generator, more efficient than the smaller generator of a two-unit system; and yet its weight is less than the combined two units.

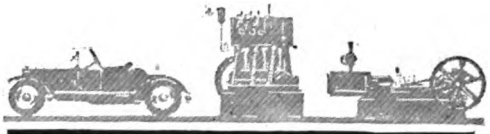
A Recent Cold Weather Test

made in temperature ranging from 7½° below to 28° above zero gave 30 consecutive starts. After the 8th start, battery allowed only 30 seconds for recuperation. Then 20 seconds of Dyneto charging gave power for 22 consecutive starts at 10 second intervals.

DYNETO ELECTRIC CO.

SYRACUSE, N. Y.

Send Us any Electrical Problems You Have



Not an Ordinary Bearing Metal

but the superior composition that gives you mileage.

AUTOBRONZE

for wrist-pin, cam-shaft, thrust-rod and pump bushings, etc., and for substituting for babbitt advantageously in certain hard-service parts in the automobile.

	Chilled	Sand Cast
Tensile strength	45-52000lb.	35-42000lb.
Elongation	7%-10%	10% -15%
Brinell Hardness	86-100	70-80
Specific Gravity		8.7
Wt. Cu. In.		0.314
Shrinkage		1/8″

AUTOBRONZE is the high-grade bearing metal for automobile construction and repair.

Lumen Bearing Company

Brass Founders

BUFFALO, N. Y.

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METALS (Continued)

BEARING METALS (Continued)

NON-GRAN—See American Bronze Co.

NORTH American Smelting Co., Ninth & Thompson Sts., Philadelphia, Pa. "Vulcan." "Philadelphia."

PARSONS—See Cramp & Sons.

PAULSON & Son, Thomas, 97 Second Ave., Brooklyn, N. Y. "Hecla."
(See page 425.)

PHILADELPHIA — See North American Smelting Co.

PHOSPHOR Bronze Smelting Co., 2200 Washington Ave., Philadelphia, Pa. "Elephant."
(See page 491.)

PIONEER Brass Works, Indianapolis, Ind.
(See page 101.)

PITTSBURGH White Metal Co., 3116 Penn Ave,. Pittsburg, Pa.

PLATA—See Atkinson Co.

PREMIER—See Empire Metal Co.

REEVES & Co., Paul S., 1415-25 Catharine St., Philadelphia, Pa.

S. A. E.—See Merchant & Evans Co.

SANFORD Co., David C., 33-39 Tulip St., Bridgeport, Conn.

SEMPER IDEM—See Wildes Son.

SHONBERG, I., 122 Flushing Ave., Brooklyn, N. Y.

SPARE'S—See American Manganese Bronze Co.

STANLEY—See Syracuse Smelting Works.

SUPERIOR—See Atkinson Co.

SYRACUSE Smelting Works, Jewell St., Brooklyn, N. Y. "Auto-Crat," "Stanley."

TRIUMPH—See Empire Metal Co.

TROJAN—See Hoyt Metal Co.

VAN WAGNER Mfg. Co., E. B., Syracuse, N. Y.
(See page 103.)

VANADIUM—See Enterprise Metal Co.

VANADIUM Metals Co., Vanadium Bldg., Pittsburgh, Pa. "Azalea."

VULCAN—See North American Smelting Co.

WHITEHOUSE LeCompte Mfg. Co., 42-54 Elm St., Newark, N. J.
(See page 235.)

WILDES Son, Thomas, New York, N. Y. "Semper Idem."

WILLIAMS & Son, E. A., 105-11 Plymouth St., Jersey City, N. J.

WING & Co., J. T., 15-19 Woodward Ave., Detroit, Mich.

ZENITE Metal Co., 518 N. Capitol Ave., Indianapolis, Ind.

PERFORATED METALS

BECKLEY Perforating Co., C. R. R. R. Ave., Garwood, N. J.

CHICAGO Perforating Co., 2445 W. 24th Pl., Chicago, Ill.

ERDLE Perforating Co., 7 Factory St., Rochester, N. Y.

HARRINGTON & King Perforating Co., 632 N. Union St., Chicago, Ill.

HENDRICK Mfg. Co., Carbondale, Pa.

MANHATTAN Perforated Metal Co., 237-39 Centre St., New York, N. Y.

MUNDT & Sons, Chas., 53-57 Fairmount Ave., Jersey City, N. J.

NORTMANN-DUFFKE Foundry Co., 27th Ave. & N. W. R. R., Milwaukee, Wis.

METERS

COMPRESSION METERS

(See Gauges, Cylinder Compression)

DISTANCE RECORDING METERS OR ODOMETERS

(For combined Odometers and Speedometers—See Speedometers)

BAUMGAERTNER, F., 2344 E. 105th St., Cleveland, O. "Coronet."

CORONET—See Baumgaertner, F.

CORONET Mfg. Co., 168 Church St., New York, N. Y.

JONES Speedometer Co., Bush Terminal, Brooklyn, N. Y.

STAR Speedometer Co., Milton, Pa.

TRANSIMETER Co., 735 Seventh Ave., New York, N. Y.

VEEDER Mfg. Co., 22 Sargeant St., Hartford, Conn.

GRADE METERS

ADAMS Co., Dubuque, Ia. "Gradometer."

AMERICAN Thermo Ware Co., 16 Warren St., New York, N. Y. (Importers.) "Autocrat."

AUTOCRAT—See American Thermo Ware Co.

GRADOMETER—See Adams Co.

WEINHAGEN, H., 159-65 Leonard St., New York, N. Y.

HEAT INDICATING METERS

(For attachment to radiator to show temperature of cooling water)

BOYCE MOTOMETER—See Motometer Co.

EDELMANN & Co., E., 225 W. Illinois St., Chicago, Ill.

FOWLER Motor Thermometer Co., Pierce Bldg., St. Louis, Mo.

MOTOMETER Co., 1790 Broadway, New York, N. Y. "Boyce Motometer."
(See page 263.)

STANDARD Thermometer Co., 65 Shirley St., Boston, Mass.
(See page 431.)

SPEED METERS

(See Speedometers)

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GENERAL ALUMINUM AND BRASS MANUFACTURING COMPANY

BEARINGS

Manufacturers of the well-known Bronze Back Babbitt Lined (not die cast) automobile bearings. Designed also for electric motors and machine tools. Ask for copy of test of our bearings made by one of the leading automobile manufacturers on 32 h.p. motor running without lubrication under full load for 23 hrs. 35 min. An efficient engineering force for advice and design is at your disposal.

Plant No. 1 — **E. Grand Blv'd and St. Aubin Ave.**

Plant No. 2 — **184 Brush Street**

DETROIT

SAMSON

MANGANESE BRONZE

Highest Tensile Strength — Ingot or Castings

THE ATKINSON CO.

Successors to Clum & Atkinson — **ROCHESTER, N. Y.**

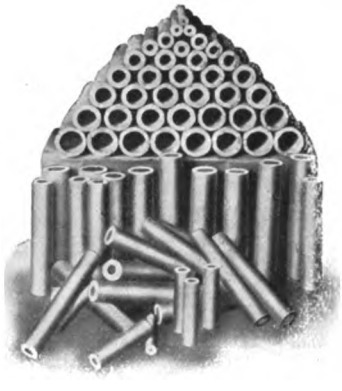
CRAMP

CORED BARS FOR BUSHINGS

Furnished either in PARSONS' WHITE BRASS or CRAMP'S SPECIAL BEARING BRONZE. Sizes of bars not shown in the list and cored whole and half bushings with end collars can be furnished from stock patterns. In ordering refer to the number in first column.

PARSONS' WHITE BRASS for main engine and crank pin bearings.

CRAMP'S SPECIAL BEARING BRONZE for wrist pin, cam-shaft, transmission bearings, valve stem guides and similar bearings.



List of cored and solid cast bars of our bearing metals in stock:

	Outside Diameter. Inches.	Inside Diameter. Inches.	Length. Inches.
1.....	1	½	6
2.....	1¼	½	6
3.....	1½	¾	12
4.....	1¾	¾	12
5.....	1¾	1	12
6.....	2	1	12
7.....	2	1¼	12
8.....	2¼	1	12
9.....	2¼	1¼	12
10.....	2½	1¼	12
11.....	2½	1½	12
12.....	2¾	1½	12
13.....	2¾	1¾	12
14.....	3	2	12
15.....	3	2¼	12
16.....	3¾	2¼	12
17.....	3¼	2½	12

Solid bars up to 2 inches diameter.

THE WILLIAM CRAMP & SONS SHIP AND ENGINE BUILDING CO.

PHILADELPHIA, PA.

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METERS (Continued)

TAXI METERS

(See Taximeters)

MICA

AMERICAN Mica Co., Newton Lower Falls, Mass.

ASHEVILLE Mica Co., Asheville, N. C.

CHICAGO Mica Co., Valparaiso, Ind.

DIELECTRIC Mfg. Co., 224 S. Vandeventer Ave., St. Louis, Mo.

GRANITE State Mica Co., Old South Bldg., Boston, Mass.

MICA Mfg. Co., 150-52 Chambers St., New York, N. Y.

MUNSELL & Co., Eugene, 68 Church St., New York, N. Y.

NEW York Mica & Mfg. Co., Auburn, N. Y.

PRESTON Co., Robert K., Monadnock Bldg., Chicago, Ill. "Prestonite."

PRESTONITE—See Preston Co.

SCHOONMAKER Co., A. O., 38 Park Pl., New York, N. Y.

SNOW FLAKE—See Western Mica Mining & Milling Co.

TAR Heel Mica Co., Plumtree, N. C.

UNITED Mica Co., Grafton Center, N. H.

WATSON Bros., 170 Purchase St., Boston Mass.

WESTERN Mica Mining & Milling Co., W. 16th Ave. & Bryant St., Denver, Colo. "Snow Flake."

MIRRORS

ADJUSTABLE DASHBOARD MIRRORS

(To enable driver to see to the rear of the car)

AMERICAN Lamp Works, 253 W. 47th St., New York, N. Y. "Liberty."

AMERICAN Thermo Ware Co., 16 Warren St., New York, N. Y. (Importers.) "Autocrat."

ANSONIA Mfg. Co., Ansonia, Conn.

ARGOS—See Motor Car Equipment Co.

AUTO Specialty Co., 416-18 N. Sycamore St., Santa Ana, Cal.

AUTOCRAT—See American Thermo Ware Co.

BALZER Co., Gus, 1777 Broadway, New York, N. Y.

COX Brass Mfg. Co., Albany, N. Y. "Reflectorscope."
(See page 357.)

GOODWIN & Kintz Co., Winsted, Conn.

GROSSMAN Mfg. Co., Emil, Bush Terminal, Brooklyn, N. Y.

HOCO—See Hoeft & Co.

HOEFT & Co., Ashland Ave. & Kinzie St., Chicago, Ill. "Hoco."

HOLT & Beebee Co., 51 Chardon St., Boston, Mass.

KALES-HASKEL Co., 441-53 Lafayette Blvd., Detroit, Mich.

LAMB Mfg. Co., Winsted, Conn.

LIBERTY—See American Lamp Works.

MOTOR Car Equipment Co., 55 Warren St., New York N. Y. (Importers.) "Argos."

PLATO Art Co., 315 Church St., New York, N. Y.
(See page 263.)

REFLECTORSCOPE—See Cox Brass Mfg. Co.

RILEY-KLOTZ Mfg. Co., 17 Mulberry St., Newark, N. J.

SMITH, H. Lund, 199-203 Paterson St., Paterson, N. J.

STANDARD Spinning & Stamping Co., 2238 Smead Ave., Toledo, O.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

WHITEHOUSE LeCompte Mfg. Co., 42-54 Elm St., Newark, N. J.
(See page 235.)

WATER GAUGE MIRRORS

KNOX Co., Frank J., Hartford, Conn.

MIXERS

FUEL MIXERS, ECONOMIZERS OR AGITATORS

AMERICAN Automobile Specialty Co., 510 S. Ashland Blvd., Chicago, Ill. "Vigor."

AMERICAN Compensating Valve Co., 630 18th St., Manitowoc, Wis.

ANSONIA Mfg. Co., Ansonia, Conn.

AUTOMATIC Device Co., 551 E. Jefferson St., Frankfort, Ind. "Economy."

AUTOMIZER Co., City Natl. Bank Bldg., Canton, O.

BEITMAN & Co., I. B., Security Bldg., Chicago, Ill.

BINGHAM Mfg. Co., 227 Prospect Ave., N W., Cleveland, O. "G. L."

BOUCHER Mfg. Co., H. E., 150 Lafayette St., New York, N. Y. "Helix."

BROWN-TAYLOR-GREENE Co., 1323-25 S. Michigan Ave., Chicago, Ill. "Empire."

BURLEIGH, Geo K., Penacook, N. H.

BUSHEY, E. J., 1790 Broadway, New York, N. Y.

CLEMMER, G. H., West Alexandria, O.

CRARY Co., 650-52 Woodward Ave., Detroit, Mich.

CRONE, F. G., 334 Genesee St., Buffalo, N. Y.

DEPPE, W. P., 127 Duane St., New York, N. Y. "Stanley."

ECONOMY—See Automatic Device Co.

ECONOMY Gas Vaporizer Co., 6 E. Maumee St., Adrian, Mich.

EDELMANN & Co., E., 225 W. Illinois St., Chicago, Ill. "Jumbo."

EMPIRE—See Brown-Taylor-Greene Co.

G. L.—See Bingham Mfg. Co.

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MOTOR SPEEDER

A $10.00 Device That is Guaranteed to Increase Mileage at Least 25%

For Automobiles and Motor Boats

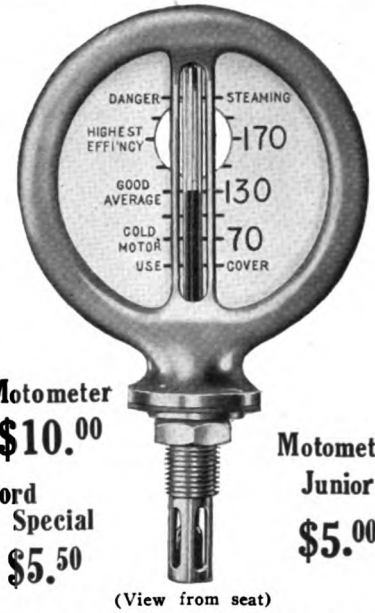
Here is a simple device, put under the hood, that automatically flushes the gasoline mixture with hot air, breaking up the globules of gasoline and making a finer and more potent mixture.

It prevents waste of gasoline, gives anywhere from 25% to 50% more mileage, produces more power, causes the engine to run smoother and better and eliminates half or more of the ordinary carbon formation. Will make better motoring and save much money. We have barrels of proof—send for some, and for our thirty days' free trial offer.

A great proposition for dealers—send for our special offer today.

"Go" Motor Speeder Company

318-324 Flint Avenue, Three Rivers, Michigan



Motometer $10.00

Ford Special $5.50

Motometer Junior $5.00

(View from seat)

Boyce Motometer attached to the radiator cap in 5 minutes

THE MOTOMETER CO., Inc.
1790 BROADWAY, NEW YORK

Go Ahead, But See What's Back Of You

It is just as necessary in careful driving to see what is behind you as it is to have a clear view ahead.
The "MIRRORED HAND" enables you to watch everything in the rear, without distracting your attention from the road ahead.
25c. is the price of this SAFETY FIRST device, consisting of high-grade diminishing mirror, with patented arrangement for easy attachment. At your dealer's, or we will mail on receipt of price. Special inducements to dealers. Unsurpassed as an advertising novelty, as the entire back is available for ads, printed in one or more colors.

For further Information, write

PLATO ART CO., 315 Church St., near Lispenard, New York

Transparent and Clear as Glass

Flexible and Tough as Canvas

PYRALIN TRANSPARENT SHEETING

Full Particulars Upon Request

THE ARLINGTON COMPANY 725-727 Broadway, New York

BOSTON PHILADELPHIA CHICAGO SAN FRANCISCO ST. LOUIS DETROIT

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MIXERS (Continued)

FUEL MIXERS, ECONOMIZERS OR AGITATORS (Continued)

GAS Saver Sales Co. 1790 Broadway, New York, N. Y. "Gasosava."

GASIFTER—See Toledo Auto Devices Co.

GASOSAVA—See Gas Saver Sales Co.

"GO" Motor Speeder Co., 318-24 Flint Ave., Three Rivers, Mich. (See page 263.)

HELIX—See Boucher Mfg. Co.

HINE-WATT Mfg. Co., 180 N. Market St., Chicago, Ill. "Sly."

IECO—See Interstate Electric Co.

INTERSTATE Electric Co., New Orleans, La. "Ieco."

JEWELL Auto Devices Co., Frankfort, Ind.

JONES & Buckoke, 1413 Michigan Ave., Chicago, Ill.

JUMBO—See Edelmann & Co.

KERO-MIX—See Patterson, F. W.

KERNODLE-M'DANIEL Co., Frankfort, Ind.

LYDON Mfg. Co., 1514 Michigan Ave., Chicago, Ill. "Speedler."

M & M Sales Co., Lewistown, Pa.

McCOY & Son, J. B., 114-20 W. 30th St., New York, N. Y. "Perfection."

MARTIN Shock Absorber Corp., 1301-1401 E. Slauson Ave., Los Angeles, Cal.

MICHENER, E. S., 80 Washington St., New Castle, Pa.

MOTOMETER Co., 1790 Broadway, New York, N. Y. (See page 263.)

MYSTIC—See Perkins Appliance Co.

NETHERWAY Mfg. Co., 214-16 E. Fourth St., Santa Ana, Cal.

NEW YORK Coil Co., 338-40 Pearl St., New York, N. Y. "Nyco."

NYCO—See New York Coil Co.

OATHOUT, Chas. M., Saugerties, N. Y.

PAR-KOP Mfg. Co., 1011 Master St., Philadelphia, Pa. "Parker."

PARKER—See Par-Kop Mfg. Co.

PATTERSON, F. W., 836 E. 43d St., Chicago, Ill. "Kero-mix."

PECK, E. C., 432 Third St., San Bernardino, Cal.

PEERLESS Motor Specialty Co., 253 W. 58th St., New York, N. Y.

PERFECTION—See McCoy & Son.

PERKINS Appliance Co., 539 Worthington St., Springfield, Mass. "Mystic."

PERPETUAL—See Ratliff, Sidney A.

PROGRESSIVE Mfg. Co., 468 64th Ave. (W. Allis), Milwaukee, Wis.

RATLIFF, Sidney A., Main St., Riverside, Cal. "Perpetual."

ROYAL-SILENT Motor Co., Los Angeles, Cal.

SAUNDERS Co., Leslie R., 1250-60 W. Seventh St., Los Angeles, Cal.

SIMPLEX Specialty Co., 1914 E. 13th St., Cleveland, O.

SIRENO Co., 18-20 Rose St., New York, N. Y. "Votex."

SLY—See Hine-Watt Mfg. Co.

SPEEDLER—See Lydon Mfg. Co.

STANLEY—See Deppe, W. P.

STEWART Machine Works, Alfred C., Tenth & Santee Sts., Los Angeles, Cal.

TOLEDO Auto Devices Co., Gardner Bldg., Toledo, O. "Gasifter."

VIGOR—See American Automobile Specialty Co.

VOTEX—See Sireno Co.

WILSON Vaporizer Co., Roslyn, Pa.

MOISTENERS

AIR OR MIXTURE MOISTENERS

(For feeding water into the intake manifold)

AXTELL, F. C., Marsh-Strong Bldg., Los Angeles, Cal.

BALZER & Son, Andover, N. J. "Powac."

HUMEFIER Co., 70 Commercial St., Worcester, Mass.

MOTOR-ECONOMY Co., 169 Massachusetts Ave., Boston, Mass.

POWAC—See Balzer & Son.

SHUMAKER Motor Car Co., J. T., 383 Canterbury Rd., Rochester, N. Y.

MONOGRAMS

ORNAMENTAL METAL MONOGRAMS

BALZER Co., Gus, 1777 Broadway, New York, N. Y.

BERNARD Co., J., 422-30 E. 53d St., New York, N. Y.

CHILDS & Co., S. D., 376 W. Monroe St., Chicago, Ill.

COLGAN Co., J. W., Sudbury Bldg., Boston, Mass.

CREUTZ Plating Co., Fifth & Elm Sts., Cincinnati, O.

CROWE Name Plate & Engraving Co., Chicago, Ill. (See page 309.)

FINE Co., Horace E., 19 E. State St., Trenton, N. J.

GREENDUCK Co., 2127 Tilden Ave., Chicago, Ill.

HANDEL Co., Louis, 138 Center St., New York, N. Y.

HANSON, C. H., 178 N. Clark St., Chicago, Ill.

HICKOK Mfg. Co., 88 St. Paul St., Rochester, N. Y.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. (See page 83.)

JOHNSTON Co., J. G., 79 Sudbury St., Boston, Mass.

MATTHEWS & Co., Jas. H. (Forbes Field), Pittsburg, Pa.

MURDOCK, Jr. Co., James, 116 Opera Pl., Cincinnati, O.

Complete Index to Classification appears on Pages 8 to 26.

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DROP FORGINGS

of every description

It takes elaborate and expensive facilities for turning out Drop Forgings promptly, accurately and economically. We are prepared to produce anything you may need and almost as quickly as you might desire it.

Whether large or small we can turn out Forgings with the greatest facility. Our prices also are most attractive because we are in a position to manufacture at the greatest advantage.

If you will send us your blue prints we will be glad to furnish quotations which will interest you.

BARNETT DROP FORGING COMPANY

Easthampton, Mass.

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MONOGRAMS (Continued)

ORNAMENTAL METAL MONOGRAMS (Continued)

NEW YORK Stencil Works, 100 Nassau St., New York, N. Y.

REES, F. H., Granite Bldg., Rochester, N. Y.

SALMAN, John A., 17-21 Bromfield St., Boston, Mass.

SCHRIDDE, Wm., 35 S. Clark St., Chicago, Ill.

SCHWERDTLE Stamp Co., 39-41 Cannon St., Bridgeport, Conn.

STAFFORD Co, N., 67 Fulton St., New York, N. Y.

WALTER & Sons, N. C., 3 Park Row, New York, N. Y.

WHITEFORD & Co., Jos. G., 165 N. Jefferson St., Chicago, Ill.

MOSS

UPHOLSTERY MOSS

BABIN, Luke B., White Castle, La.

KOHLMANN Moss & Cotton Felt Mfg. Co., 1224-30 St. Thomas St., New Orleans, La.

WOLL & Sons Mfg. Co., Peter, Hancock & Berks Sts., Philadelphia, Pa.

MOTORS

ELECTRIC AUTOMOBILE MOTORS

DIEHL Mfg. Co., Elizabethport, N. J. (See page 227.)

GENERAL Electric Co., Schenectady, N. Y.

WAGNER Electric Mfg. Co., 6400 Plymouth Ave., St. Louis, Mo.

WESTINGHOUSE Electric & Mfg. Co., (E. Pittsburg) Pittsburg, Pa.

GASOLINE AUTOMOBILE MOTORS

AUTOPARTS Mfg. Co., Detroit, Mich.

BEAVER Mfg. Co., 2502 First Ave., Milwaukee, Wis.

BINSSE Machine Co., Harrison, N. J. "Howard."

BRENNAN Motor Co., 105 Grape St., Syracuse, N. Y.

BUDA Co., Harvey, Ill.

CHRISTENSEN Engineering Co., 841-47 30th St., Milwaukee, Wis.

CONTINENTAL Motor Mfg. Co., Detroit, Mich. (See page 267.)

CRESCENT Motor Co., Cincinnati, O.

CROSS Gear & Engine Co., Detroit, Mich. (See page 293.)

DART Motor Truck Co., Ainsborough & Stratford Aves., Waterloo, Ia.

DAVIS Mfg. Co., 15th Ave. & Park St., Milwaukee, Wis. (See page 361.)

DICE Engine Co., 50 W. 16th St., Anderson, Ind.

ERGON—See Hazard Motor Mfg. Co.

FALLS Machine Co., Sheboygan Falls, Wis.

FARMER Mfg. Co., Fordyce & Marston Sts., Detroit, Mich. (See page 643.)

FITZ-HUGH, Luther, Engineering Co., Lytton Bldg., Chicago, Ill.

FRANKLIN Machine Co., 770 Franklin Ave., Brooklyn, N. Y.

FRISBIE Motor Co., 56 College St., Middletown, Conn.

GOLDEN, Belknap & Swartz Co., 1248 Grand River Ave., Detroit, Mich.

HAZARD Motor Mfg. Co., Rochester, N. Y. "Ergon."

HERRMAN Engineering Co., 265 Jefferson Ave., Detroit, Mich.

HERSCHELL-SPILLMAN Co., North Tonawanda, N. Y. (See page 495.)

HOOSIER Motor Co., Goshen, Ind.

HOOVEN, Owens, Rentschler Co., Hamilton, O.

HOWARD—See Binsse Machine Co.

KEMP Machine Works, 1215 S. Franklin St., Muncie, Ind.

LYCOMING Foundry & Machine Co., Williamsport, Pa. (See page 635.)

LYONS Atlas Co., Indianapolis, Ind. (See page 650.)

MILWAUKEE Auto Engine & Supply Co., 706-08 Winnebago St., Milwaukee, Wis.

MONARCH Motor Mfg. Co., 4636 W. Madison St., Chicago, Ill.

N-P Motor Co, 817 Monadnock Bldg., Chicago, Ill. (See page 489.)

NORTHWAY Motor & Mfg. Co., 510-14 Maybury Grand Ave., Detroit, Mich.

OULTON Motor & Mfg. Co., 311 Atlantic Ave., Boston, Mass.

PALMER-MOORE Co., 100 N. Geddes St., Syracuse, N. Y.

PENINSULAR Auto Parts Co., 46 Lafayette Ave., E., Detroit, Mich.

PITTSBURGH Model Engine Co., Pittsburgh, Pa. (See page 497.)

PORT HURON Construction Co., Port Huron, Mich.

REGAL Gasoline Engine Co., Coldwater, Mich.

ROBERTS Motor Co., 1435 Columbus Ave., Sandusky, O.

ROCHESTER Motors Co., 5 Wren St., Rochester, N. Y.

ROCKEFELLER Engine Co., Central Ave. & E. 65th St., Cleveland, O.

RUTENBER Motor Co., Marion, Ind. (See page 269.)

SCHLOSSER Mfg. Co., 151 E. 126th St., New York, N. Y.

SOMMER Motor Co., Bucyrus, O.

STERLING Motor Co., 1145 W. Grand Blvd., Detroit, Mich.

TEETOR-HARTLEY Motor Co., Hagerstown, Ind.

Complete Index to Classification appears on Pages 8 to 26.

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First in the Specifications

123 Pleasure and Commercial Vehicle Manufacturers list the certainty of Continental Motors as first in the specifications.

For out of the eight good qualities for which any Truck or Car is selected, six depend on the motor alone.

√Silence	√Economy
√Power	√Flexibility
√Speed	Simplicity
√Endurance	Appearance

Continental Motors

In these six particulars, Continental reputation for excellence is years long, world-wide, and unassailably supreme.

Thus does this Standard Motor establish the worth of the manufacturers' product in which it is installed.

For this reason Continental comes first in the specifications.

For this reason 123 Manufacturers make sure of sales and satisfaction by building into their product the Certainty of Continental Motors. It is irrefutable that this standard Motor, representing one-fourth of the total manufacturing cost of a Car or Truck, guarantees *three-fourths of its potentiality for service.*

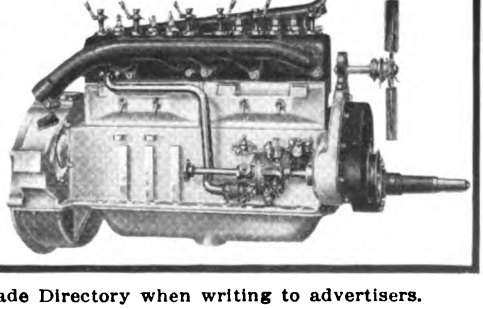
See that Continental Certainty is in your next Car.

CONTINENTAL MOTOR MFG. CO.

Largest exclusive Motor Builders in the world

DETROIT, MICH.

FACTORIES: DETROIT and MUSKEGON



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MOTORS (Continued)

GASOLINE AUTOMOBILE MOTORS (Continued)

TREBERT Engine Works, H. L. F., 495 St. Paul St., Rochester, N. Y.

WARNER-DETROIT Motor Works, Dime Savings Bank Bldg., Detroit, Mich.

WARNER Mfg. Co., Toledo, O.
(See page 243.)

WAUKESHA Motor Co., Waukesha, Wis.
(See page 273.)

WHITEFORD & Co., Jos. G., 165 N. Jefferson St., Chicago, Ill.

WISCONSIN Motor Mfg. Co., Station A., Milwaukee, Wis.
(See page 379.)

YALE Steel Stamping Co., Oostburg, Wis.

GASOLINE CYCLECAR MOTORS

BEAVER Mfg. Co., 2502 First Ave., Milwaukee, Wis.

CLARK Engine & Boiler Co., Kalamazoo, Mich.

DE LUXE—See Spacke Machine Co.

FARMER Mfg. Co., Fordyce & Marston Sts., Detroit, Mich.
(See page 643.)

HERRMAN Engineering Co., 265 Jefferson Ave., Detroit, Mich.

IVES Motorcycle Corp., Owego, N. Y.

KEMP Machine Works, 1215 S. Franklin St., Muncie, Ind.

LYCOMING Foundry & Machine Co., Williamsport, Pa.
(See page 635.)

MACK—See Universal Machinery Co.

MASSNICK-PHIPPS Mfg. Co., 1091 Champlain St., Detroit, Mich.

MOTOR Products Co., Dodge Bldg., Detroit, Mich.

N-P Motor Co., 817 Monadnock Bldg., Chicago, Ill.
(See page 489.)

O. B.—See Universal Mfg. Co.

OAKBROOK Motor Mfg. Co., Angelica & Wood Sts., Reading, Pa.

REX Motor Co., Labadie St. (Ford City), Wyandotte, Mich.

ROCHESTER Motors Co., 5 Wren St., Rochester, N. Y.

SPACKE Machine Co., F. W., Indianapolis, Ind. "De Luxe."
(See page 253.)

UNIVERSAL Machinery Co., 1910-20 St. Paul Ave., Milwaukee, Wis. "Mack."

UNIVERSAL Mfg. Co., 308-10 Ninth St., S., Minneapolis, Minn. "O. B."

WIZARD Motor Co., 222 W. Merrill St., Indianapolis, Ind.

STEAM AUTOMOBILE MOTORS

(See Engines, Steam)

MOULDING

BRASS MOULDING

BRIDGEPORT Brass Co., P. O. Station L., Bridgeport, Conn.
(See page 323.)

COWLES & Co., C., New Haven, Conn.
(See page 87.)

DOUGLAS & Lomason Co., Detroit, Mich.
(See page 211.)

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

JONAH & George, Merrimac, Mass.

KINSEY Mfg. Co., Toledo, O.

MANHATTAN Brass Co., 328 E. 28th St., New York, N. Y.

METAL Stamping Co., 18th St. & Boulevard, Long Island City, N. Y.

RANDOLPH-CLOWES Co., Waterbury, Conn.

ROME Brass & Copper Co., Rome, N. Y.

SMITH & Co., Jos. N., Detroit, Mich.
(See page 547.)

WHITE Mfg. Co., 155 Cannon St., Bridgeport, Conn.

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

RUNNING BOARD MOULDING

(See also Moulding, Brass; also Moulding, Steel)

ALITE—See Zenite Metal Co.

ALUMINUM Co. of America, Pittsburg, Pa.

BRIDGEPORT Brass Co., P. O. Station L., Bridgeport, Conn.
(See page 323.)

DAHLSTROM Metallic Door Co., 36 Blackstone Ave., Jamestown, N. Y.

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

METALLIC Automobile Matting Co., Rochester, N. Y.
(See page 495.)

SMITH & Co., Jos. N., Detroit, Mich.
(See page 547.)

WATERBURY Brass Goods Corp., 160 Washington Ave., Waterbury, Conn.

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

ZENITE Metal Co., 518 N. Capitol Ave., Indianapolis, Ind. "Alite."

STEEL MOULDING

DAHLSTROM Metallic Door Co., 36 Blackstone Ave., Jamestown, N. Y.

MUFFLERS

EXHAUST MUFFLERS

A-Z Co., 530 W. 56th St., New York, N. Y.

ANTI-EXPLO—See Garage Equipment Mfg. Co.

B. G. & M. Mfg. Co., 543 N. Franklin St., Chicago, Ill.

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No motor-driven vehicle is any better than its motor. Fine body design, honest springs and suspension, efficient starting, lighting and ignition systems, staunch axles, perfect gears and high-priced tires are all useless when the motor refuses to deliver the power.

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The efficiency of the Rutenber Motor is not a matter of luck or of accident. It is the result of nearly fifteen years of consistent endeavor and experience in designing and building automobile motors. Every Rutenber Motor is built with Rutenber fidelity to details; every one is tested again and again before it leaves the Rutenber plant. Non-essentials are conspicuously absent from Rutenber Motors. Simplicity is their key-note. Service is the standard by which they are to be judged.

If you are interested in motor **service** and economy, whether as a manufacturer, a dealer or an owner, it will profit you to read the Rutenber Literature, copies of which will be furnished on request.

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MUFFLERS (Continued)

EXHAUST MUFFLERS (Continued)

BRISCOE Mfg. Co., Woodward & Baltimore Aves., Detroit, Mich. (See page 331.)

BRISKIN Mfg. Co., 539 N. Capitol Ave., Indianapolis, Ind.

BUFFALO Pressed Steel Co., Military Rd. & Lansing St., Buffalo, N. Y.

BYRNE, Kingston & Co., 1040 Webster St., Kokomo, Ind. "Kingston."

CONSOLIDATED Gas & Electric Co., 552 W. Lake St., Chicago, Ill. "Non-Clog."

DUNKIRK Corporation, Dunkirk, N. Y. "Ejector."

EJECTOR—See Dunkirk Corp.

EVERETT Mfg. Co., 162-64 N. May St., Chicago, Ill.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Anti-Explo," "Gemco." (See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

GRAY-HAWLEY Mfg. Co., 937-43 Jefferson Ave., Detroit, Mich.

HAYES Mfg. Co., Detroit, Mich.

JANNEY, Steinmetz & Co., Philadelphia, Pa. (See page 403.)

KELLS Mfg. Co., W. J., 521-25 W. 45th St., New York, N. Y. (See page 203.)

KINGSTON—See Byrne, Kingston & Co.

KINSEY Mfg. Co., Toledo, O. "Kinwood."

KINWOOD—See Kinsey Mfg. Co.

LAWSON Co., F. H., Cincinnati, O. "Yale."

MAXIM Silencer Co., 60 Huyshope Ave., Hartford, Conn.

MICHIGAN Stamping Co., 759-71 Bellevue Ave., Detroit, Mich.

MITCHELL & Son, G. F., 6501 Cedar Ave., Cleveland, O.

NON-CLOG—See Consolidated Gas & Electric Co.

OLDBERG Mfg. Co., Detroit, Mich. (See page opposite Title Page.)

POWELL Muffler & Timer Co., 42 La Fayette St., Utica, N. Y. (See page 441.)

ROCK, John G., 452 W. Lincoln Ave., Mt. Vernon, N. Y.

SANFORD Mfg. Co., F. C., Bridgeport, Conn. (See page 511.)

TROIKE Muffler & Mfg. Co., Lorain, O.

WIENER-BARNET Co., 312-28 Adams St., Newark, N. J. (See page 249.)

XARDELL Bros. Co., 28 Broadway, Utica, N. Y.

YALE—See Lawson Co.

YANKEE Co., 69 Genesee St., Utica, N. Y.

THROAT MUFFLERS

BRADLEY Knitting Co., Delavan, Wis.

SCOTT Knitting Co., 1021 Gallia St., Portsmouth, O.

WAY Muffler Co., 23d & Arch Sts., Philadelphia, Pa.

NAILS

UPHOLSTERY NAILS

(See Tacks, Upholstery)

NIPPLES

PIPE NIPPLES

(See Fittings, Pipe)

PUMP NIPPLES

(See Connections, Tire Pump)

NUMBERS

LAMP NUMBERS

BALZER Co., Gus, 1777 Broadway, New York, N. Y.

FINE Co., Horace E., 19 E. State St., Trenton, N. J.

LICENSE NUMBERS OR HANGERS

(For License Holders—See Holders, License)

ALUMINUM Goods Mfg. Co., Manitowoc, Wis.

BALTIMORE Enamel & Novelty Co., ft. Allen St., Baltimore, Md.

BALZER Co., Gus, 1777 Broadway, New York, N. Y.

FINE Co., Horace E., 19 E. State St., Trenton, N. J.

INGRAM-RICHARDSON Mfg. Co., Beaver Falls, Pa.

LIMERICK Co., J. Arthur, 960 N. Howard St., Baltimore, Md. (See page 369.)

MURDOCK, Jr. Co., Jas., 116 Opera Pl., Cincinnati, O.

NIAGARA Falls Metal Stamping Works, 23o Tenth St., Niagara Falls, N. Y.

NOONAN Tool & Machine Works, A. S., 130-36 St. James St., Rome, N. Y.

QUAYLE Enamel Co., Albany, N. Y.

ROYAL Enameling & Mfg. Co., 336 W. Madison St., Chicago, Ill.

STAFFORD Co., N., 67 Fulton St., New York, N. Y.

STILLMAN, A. P., 124 Chambers St., New York, N. Y.

WHITEFORD & Co., Jos. G., 165 N. Jefferson St., Chicago, Ill.

NUTS

CASTELLATED NUTS

AMERICAN Iron & Steel Mfg. Co., Front & Cumberland Sts., Lebanon, Pa.

BRIGHTMAN Mfg. Co., Columbus, O.

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STOCK SHEETS 6" WIDE BY 36" LONG

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No filing or rescraping necessary as with the solid shim.

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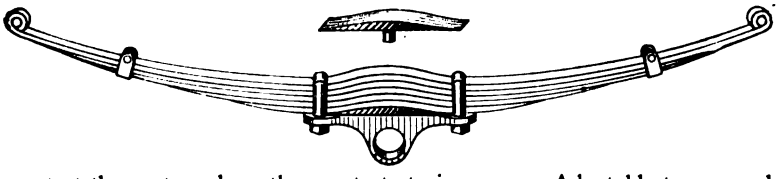

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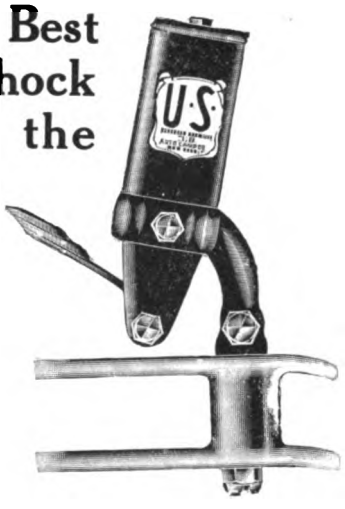

$16.00 per set of 2 up to 2600 lbs.
$18.00 " " " 2 from 2700 lbs. and above
.75 for each spring of 300 to 500 lbs.
$1.25 for " " above 500 lbs.

For Ford

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NUTS (Continued)

CASTELLATED NUTS (Continued)

CHICAGO Screw Co., Homan Ave. & Fillmore St., Chicago, Ill.
(See pages 231 and 345.)

CLARK Bros. Bolt Co., Milldale, Conn.
(See page 77.)

COLUMBIA Nut & Bolt Co., 1550 Railroad Ave., Bridgeport, Conn.

DETROIT Screw Works, Detroit, Mich,
(See page 347.)

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

GARLAND Nut & Rivet Co., Bailey-Farrell Bldg., Pittsburg, Pa.

GRAHAM Nut Co., Pittsburg, Pa.

MILTON Mfg. Co., Milton, Pa.

NATIONAL-ACME Mfg. Co., Cleveland, O.
(See page 395.)

NATIONAL Bolt & Nut Co., Pittsburg, Pa.

NATIONAL Screw & Tack Co., Cleveland, O.
(See page 77.)

RHODE Island Tool Co., Providence, R. I.

RUSSELL, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

ST. LOUIS Screw Co., Clarence & Bulwer Aves., St. Louis, Mo.

STANDARD Screw Co., 79 Beacon St., Worcester, Mass.

UPSON Nut Co., Unionville, Conn.

WESTERN Automatic Machine Screw Co., 750 Lake Ave., Elyria, O.
(See page 351.)

FINISHED AND CASE HARDENED NUTS

AMERICAN Iron & Steel Mfg. Co., Front & Cumberland Sts., Lebanon, Pa.

ATLAS Bolt & Screw Co., 1289 Marquette Rd., N. E., Cleveland, O.

BRIGHTMAN Mfg. Co., Columbus, O.

CHICAGO Screw Co., Homan Ave. & Fillmore St., Chicago, Ill.
(See pages 231 and 345.)

CLARK Bros. Bolt Co., Milldale, Conn.
(See page 77.)

DETROIT Screw Works, Detroit, Mich.
(See page 347.)

GARLAND Nut & Rivet Co., Bailey-Farrell Bldg., Pittsburg, Pa.

GRAHAM NUT CO., Pittsburg, Pa.

HARTFORD Machine Screw Co., Hartford, Conn.
(See page 301.)

HASKELL Mfg. Co., Wm. H., 24 Commerce St., Pawtucket, R. I.

MILTON Mfg. Co., Milton, Pa.

NATIONAL-ACME Mfg. Co., Cleveland, O.
(See page 395.)

NATIONAL Bolt & Nut Co., Pittsburg, Pa.

NATIONAL Screw & Tack Co., Cleveland, O.
(See page 77.)

NEW HAVEN Machine Screw Co., New Haven, Conn.

PAWTUCKET Mfg. Co., 327 Pine St., Pawtucket, R. I.

PENINSULAR Milled Screw Co., Lafayette St., Detroit, Mich.

PITTSBURG Screw & Bolt Co., Preble Ave. (N. S.), Pittsburg, Pa.

REED & Prince Mfg. Co., Duncan Ave., Worcester, Mass.

RHODE Island Tool Co., Providence, R. I.

RUSSELL, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

WESTERN Automatic Machine Screw Co., 750 Lake Ave., Elyria, O.
(See page 351.)

LOCK NUTS AND WASHERS

AMERICAN Lock-Nut Co. (Pullman Station), Chicago, Ill.

AMERICAN Nut & Bolt Fastener Co., Pittsburg, Pa. "Bartley."

BARTLEY—See American Nut & Bolt Fastener Co.

CINCINNATI Screw & Tap Co., 2442 Beekman St., Cincinnati, O.

COLUMBIA Nut & Bolt Co., 1550 Railroad Ave., Bridgeport, Conn. "Gib."

EMPIRE Automatic Equipment Co., Syracuse, N. Y. "Tite-Wad."

GIB—See Columbia Nut & Bolt Co.

GRIP Nut Co., McCormick Bldg., Chicago, Ill.

H. P. L. Washer & Safety Bolt Mfg. Co., 121 Charlotte St., Lancaster, Pa.

HOBBS Mfg. Co., Worcester, Mass.

HUGTITE—See United Nut Lock Co.

NATIONAL Lock Washer Co., Johnson & Herman Sts., Newark, N. J.

POSITIVE Lock Washer Co., Newark, N. J.
(See page 451.)

RELIANCE Mfg. Co., Massillon, O.
(See page 451.)

ST. LOUIS Screw Co., Clarence & Bulwer Aves., St. Louis, Mo.

STEEL Specialties Co., 79 Milk St., Boston, Mass. "W. W. W."

TITE-WAD—See Empire Automatic Equipment Co.

TORSION Nut-Lock & Washer Co., 26 Pemberton Sq., Boston, Mass.

UNITED Nut Lock Co., Springfield, Mass. "Hugtite."

U. S. Lock Washer Co., 34-36 Brenner St., Newark, N. J.

UNIVERSAL Lock-Washer Co., 1555-65 Railroad Ave., Bridgeport, Conn.

W. W. W.—See Steel Specialties Co.

THUMB OR WING NUTS

ATLAS Bolt & Screw Co., 1289 Marquette Rd., N. E., Cleveland, O.

BILLINGS & Spencer Co., Hartford, Conn.

CHICAGO Nut Co., 617-31 W. Jackson Blvd., Chicago, Ill.

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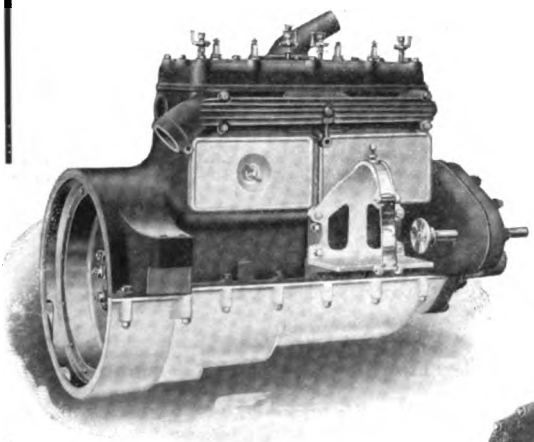
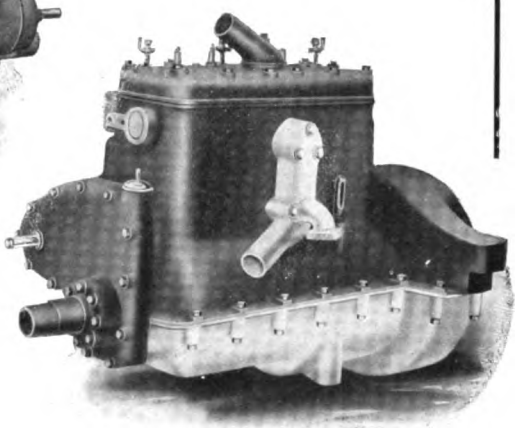
WAUKESHA SERVICE





Front and Back Views
Model "TU4"
3½" x 5¼"

Stop and think before you adopt a motor. Waukesha Service means this.

Your customers will have small repair bills. Our repair business is 8% of our whole business. Replacement on our guarantee is only ½ of 1 per cent. Shipment of repairs for over two years indicate the following facts,—

80% of all repair orders shipped same day received. 15% on second day. 5% thereafter, for various reasons.

Waukesha Motors are not sold at cost price to foster a large future repair business.

You pay an honest price for your motor and that ends your expense.

Compare these fundamental facts with others before you buy.

Waukesha Motors manufactured in these sizes:

3¾ x 5¾	4½ x 5¾	4½ x 6¾
4¼ x 5¾	4¼ x 6¾	4¾ x 6¾

WAUKESHA MOTOR CO.

WAUKESHA **WISCONSIN**

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NUTS (Continued)

THUMB OR WING NUTS (Continued)

CHICAGO Screw Co., Homan Ave. & Fillmore St., Chicago, Ill. (See pages 231 and 345.)

CLARK Bros. Bolt Co., Millidale, Conn. (See page 77.)

COLUMBUS Bolt Works, Columbus, O.

CORBIN Screw Corp., 219 High St., New Britain, Conn.

DETROIT Screw Works, Detroit, Mich. (See page 347.)

DEVLIN Mfg. Co., Thos., Third & Lehigh Aves., Philadelphia, Pa.

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

GARLAND Nut & Rivet Co., Bailey-Farrell Bldg., Pittsburg, Pa.

HASKELL Mfg. Co., Wm. H., 24 Commerce St., Pawtucket, R. I.

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

PENINSULAR Milled Screw Co., Lafayette St., Detroit, Mich.

ST. LOUIS Screw Co., Clarence & Bulwer Aves., St. Louis, Mo.

UPSON Nut Co., Unionville, Conn.

WESTERN Automatic Machine Screw Co., 750 Lake Ave., Elyria, O. (See page 351.)

WHITMAN & BARNES Mfg. Co., Akron, O.

OILS

LUBRICATING OILS

A-B-C—See Layton Park Oil & Soap Co.

ACHESON Oildag Co., Port Huron, Mich. "Oildag."

ADMISCO—See Millers Sons Co.

ADVANCE Oil Works, 310-12 Flushing Ave., Brooklyn, N. Y.

AJAX Oil & Grease Co., 170 W. 65th St., New York, N. Y.

ALASKA—See Viscosity Oil Co.

ALBANY Lubricating Co., 708-710 Washington St., New York, N. Y.

ALEXANDER & Co., H. T., 17 Battery Pl., New York, N. Y. "Grand Prix."

AMALIE—See Sonneborn Sons.

AMERICAN Oil Co., Jackson, Mich. "Amoco."

AMERICAN Solidified Oil Works, Post Office Sq., Boston, Mass.

AMOCO—See American Oil Co.

APEX—See Viscosity Oil Co.

ARCO—See Atlantic Refining Co.

ATLANTIC Refining Co., Euclid Ave. & E. 65th St., Cleveland, O. "Arco."

ATLAS—See Swan & Finch Co.

AURORA—See Pigot-Sayre Co.

AUTLUBO—See Moore Oil Co.

AUTO Oil Co., 172 S. Water St., Jackson, Mich. "Diamond Cross."

AUTO-USE-IT—See Sawyer Oil Co.

AUTOLEUM—See Chesterton Co.

AUTOLINE—See Robinson & Son Co.

BAKER, Wm. T., 220-32 Suydam Ave., Jersey City, N. J. "Paramount."

BALKAN—See Jones & Bro., J.

BALSO Oil Co., Ohio Bldg., Toledo, O.

BANNER—See Clarkson & Ford Co.

BAUM'S Castorine Co., 104 N. George St., Rome, N. Y.

BELDEN & Co., A. G., 145 Maiden Lane, New York, N. Y. "Valvone," "Pycnoleum."

BELL Oil Co., 53 E. Ferry St., St. Louis, Mo. "Liberty Bell."

BLIVEN & Carrington, 125 Broad St., New York, N. Y. "Champion."

BLUE RIBBON—See Sawyer Oil Co.

BORNE, Scrymser Co., 80 South St., New York, N. Y. "Colonial."

BUCK & Co., E. A., Worcester, Mass.

BULLY—See Weinberg & Co.

CALYPSOL—See Cataract Refining & Mfg. Co.

CASPIAN—See Viscosity Oil Co.

CATARACT Refining & Mfg. Co., Marine National Bank Bldg., Buffalo, N. Y. "Calypsol."

CENTURY—See Davey & Co.

CHAMPION—See Bliven & Carrington.

CHARTER OAK—See Hall-Thompson Co.

CHESTERTON Co., A. W., 64 India St., Boston, Mass. "Autoleum."

CINCINNATI Oil Works Co., Cincinnati, O.

CLARKSON & Ford Co., 55 Water St., New York, N. Y. "Banner."

COLGAN Mfg. & Supply Co., 42 South St., New York, N. Y.

COLONIAL—See Borne, Scrymser Co.

COMMODORE—See Miller Co.

CONNECTICUT Oil Co., 549 S. Leonard St., Waterbury, Conn.

CONTINENTAL Oil Products Co., 1467 Michigan Ave., Chicago, Ill.

CORTLAND Specialty Co., 174-78 Railroad St., Cortland, N. Y. "Houts Warren."

CRANE & Co., L. M., 91 Oliver St., Boston, Mass. "Eureka."

CRAWFORD Co., Wm. J., 14 Wood St., Pittsburg, Pa.

CREW Levick Co., Land Title Bldg., Philadelphia, Pa. "Perfection."

CROWN—See Great Western Oil Co.

CRYSTALENE—See Viscosity Oil Co.

CYLOIL—See Ilsley, Doubleday & Co.

DAVEY & Co., 2600 Grand Ave., Chicago, Ill. "Century."

DEARBORN Chemical Co., McCormick Bldg., Chicago, Ill.

DEFIANCE—See Waverly Oil Works Co.

DIAMOND CROSS—See Auto Oil Co.

DRAKE Oil Co., 99 E. Spring St., Titusville, Pa. "Speed-Oil."

DUPLEX—See Enterprise Oil Co.

EAGLE Oil & Supply Co., Boston, Mass. "No-Karbon," "Eagleine." (See page 277.)

EAGLEINE—See Eagle Oil & Supply Co.

EARLENE—See Franklin Oil Works.

EASTERN Supply Co., Hammond & Canterbury Sts., Worcester, Mass.

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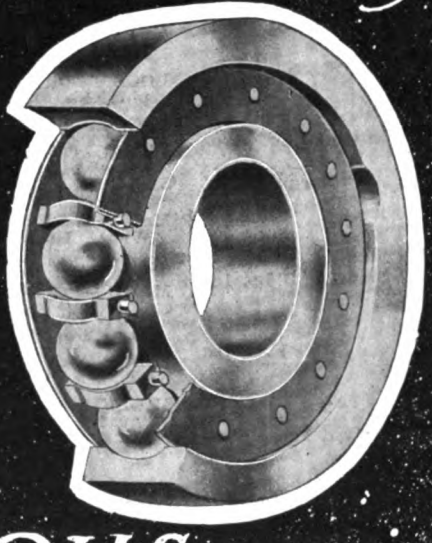
MADE IN GERMANY



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OILS (Continued)

LUBRICATING OILS (Continued)

EMCO—See Emery Mfg. Co.

EMERY Mfg. Co., Bradford, Pa. "Emco."

ENERGINE Refining & Mfg. Co., The Arcade, Cleveland, O.

ENSIGN Refining Co., 10605 Quebec Ave., Cleveland, O.

ENTERPRISE Oil Co., 164 Chandler St., Buffalo, N. Y. "Duplex."

EUCLID—See Reliance Oil & Grease Co.

EUREKA—See Crane & Co.

EXCELSIOR—See Miller's Sons.

EXCELSIOR—See Mills Oil Co.

EXPERT—See Warren Refining Co.

F. V.—See Wadhams Oil Co.

FAULTLESS—See Hawkeye Oil Co.

FIDELITY Oil Co., 306-10 E. 17th St., Kansas City, Mo.

FISKE Bros. Refining Co., 24 State St., New York, N. Y. "Lubroleine."

FRANK Oil Co., 23 W. Spring St., Titusville, Pa.

FRANKLIN—See Viscosity Oil Co.

FRANKLIN Oil Works, E. Atlantic Ave., Franklin, Pa. "Earlene."

FRAZER Lubricator Co., 3921 Normal Ave., Chicago, Ill.

FRENCH—See Marshall Oil Co.

FULCRUM Oil Co., Franklin, Pa.

GENERAL Oil Works Co., Traction Bldg., Indianapolis, Ind. "Reliable."

GRAND PRIX—See Alexander & Co.

GREAT Western Oil Co., 2855 E. 37th St., Cleveland, O. "Nokarbo," "Crown."

GREENSLADE Oil Co., 40 Jefferson Ave., Detroit, Mich. "Packard 24-30."

GULF Refining Co., Pittsburg, Pa. "Supreme."
(See page 279.)

HAGGERTY Refining Co., 50 South St., New York, N. Y. "Thermo."

HALL-THOMPSON Co., Hartford, Conn. "Charter Oak."

HARRIS & Co., Elmer E., 2 Maurice St., Buffalo, N. Y.

HARRIS Oil Co., A. W., 326 S. Water St., Providence, R. I.

HAVOLINE—See Indian Refining Co.

HAWKEYE Oil Co., Waterloo, Ia. "Faultless."

HAWS, George A., 142-44 Front St., New York, N. Y. "Panhard."
(See page 277.)

HIGH Grade Oil Refining Co., 68 Broad St., New York, N. Y. "Hygrade," "Motorene," "Packard," "Lozier."

HINDS & Coon, 124-26 Pearl St., Boston, Mass. "Peach."

HOLLINGSHEAD Co., R. M., Camden, N. J. "Whizoil."

HOUTS WARREN—See Cortland Specialty Co.

HOUGHTON & Co., E. F., 240 W. Somerset St., Philadelphia, Pa.

HYGRADE—See High Grade Oil Refining Co.

IDEAL—See Sheppard, W. S.

ILSLEY, Doubleday & Co., 229-31 Front St., New York, N. Y. "Cyloil."

IMPERIAL Oil Co., 3124 Locust St., St. Louis, Mo.

INDIAN Refining Co., 17 Battery Pl., New York, N. Y. "Havoline."

INTERSTATE Chemical Co., 12-20 Bayview Ave., Jersey City, N. J.

INTER-TUBE Chemical Co., Schofield Bldg., Cleveland, O.

INVADER Oil Co., 80 Broad St., New York, N. Y.

INVINCIBLE—See Millers Sons Co.

JONES & Bro., J., 429 Locust St., Philadelphia, Pa. "Balkan."

KELLOGG & Co., E. H., 238-48 South St., New York, N. Y.

KENDALL Refining Co., Bradford, Pa.

KEYSTONE Lubricating Co., 1331 Race St., Philadelphia, Pa.

KOSMOS—See Mulliken Oil Co.

LAYTON Park Oil & Soap Co., Milwaukee, Wis. "A-B-C."

LIBERTY—See Richardson Lubricating Co.

LIBERTY BELL—See Bell Oil Co.

LOOS & Dilworth, 134 S. Front St., Philadelphia, Pa. "Pioneer."

LOZIER—See High Grade Oil Refining Co.

LUBRO Oil Co., 116 Prospect Ave., N. W., Cleveland, O.

LUBROLEINE—See Fiske Bros. Refining Co.

McLEAN-JONES Oil & Supply Co., 40 India Wharf, Boston, Mass. "Swastika."

MAGIC—See Reliance Oil & Grease Co.

MAGIC—See Viscosity Oil Co.

MAGIE Bros., 110-12 S. Clinton St., Chicago, Ill. "Rock."

MARSHALL Oil Co., Marshalltown, Ia. "French."

MILLER Co., Wm. P., 244-50 Green St., Brooklyn, N. Y. "Commodore."

MILLER'S Sons, Wm. P., 298-302 Hancock St., Long Island City, N. Y. "Excelsior," "Pan-O-Lite."

MILLERS Sons Co., A. D., 3300 Grand Blvd., Pittsburg, Pa. "Admisco."

MILLS Oil Co., 263 Walton St., Syracuse, N. Y. "Excelsior."

MOBILOIL—See Vacuum Oil Co.

MONAMOBILE—See Monarch Mfg. Co.

MONARCH Mfg. Co., Council Bluffs, Ia. "Monamobile."

MONOGRAM—See New York Lubricating Oil Co.

MOORE Oil Co., York St. & McLean Ave., Cincinnati, O. "Autlubo."

MOTORENE—See High Grade Oil Refining Co.

MOTORLIGHT—See Petroleum Coke Co.

MOTORLUBE—See Tygert Co.

MOTOROL—See New York & New Jersey Lubricant Co.

MULLIKEN Oil Co., 200 Friend St., Boston, Mass. "Kosmos."

MURPHYS—See Phoenix Oil Co.

NATIONAL Oil & Supply Co., 180 Frelinghuysen Ave., Newark, N. J. "Viscos."

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OILS (Continued)

LUBRICATING OILS (Continued)

NATIONAL Refining Co., Rose Bldg., Cleveland, O.

NEW York Lubricating Oil Co., 116 Broad St., New York, N. Y. "Monogram." (See page 633.)

NEW York & New Jersey Lubricant Co., 165 Broadway, New York, N. Y. "Motorol."

NOBLE Refining Co., 706 Canal Rd., Cleveland, O.

NO-KARBON—See Eagle Oil & Supply Co.

NOKARBO—See Great Western Oil Co.

NYE, Wm. F., New Bedford, Mass.

OIL City Oil & Grease Co., 365-77 Seneca St., Oil City, Pa. "Pensoil."

OIL Products Co., 17 Battery Pl., New York, N. Y. "Usoline."

OILDAG—See Acheson Oildag Co.

OILZUM—See White & Bagley Co.

OTTOMO—See Pioneer Mfg. Co.

OZARK—See Tropical Oil Co.

PACKARD—See High Grade Oil Refining Co.

PACKARD—See Wolverine Lubricants Co. of New York.

PACKARD 24-30—See Greenslade Oil Co.

PANAMA Oil & Grease Co., 159-61 W. 51st St., New York, N. Y.

PANHARD—See Haws, Geo. A.

PAN-O-LITE—See Miller's Sons.

PARAGON Refining Co., Front St., Toledo, O. "Petrolene."

PARAMOUNT—See Baker, Wm. T.

PARAMOUNT—See Viscosity Oil Co.

PATHFINDER—See Sweet, Charles F.

PATTERSON Lubricating Co., 114 Broad St., Boston, Mass.

PENN Oil Co., W. 12th St., Erie, Pa.

PENN Oil & Supply Co., Chicago, Ill.

PENN Petroleum Co., 115-17 N. Second St., Philadelphia, Pa. "Primus."

PENSOIL—See Oil City Oil & Grease Co.

PERFECTION—See Crew Levick Co.

PERFECTION—See Wood Co.

PERRY Oil Co., 372 Central Ave., Pawtucket, R. I.

PETROLENE—See Paragon Refining Co.

PETROLEUM Coke Co., Edgemont & Venango Sts., Philadelphia, Pa. "Motorlight."

PETROLEUM Products Co., 3600-10 Grant Blvd., Pittsburg, Pa. "Sound Proof."

PHOENIX Oil Co., 2554 W. Fifth St., Cleveland, O. "Murphys."

PIGOT-SAYRE Co., 71-73 Front St., New York, N. Y. "Aurora."

PIONEER—See Loss & Dilworth.

PIONEER Mfg. Co., 5220 Sweeney Ave., S. E., Cleveland, O. "Ottomo."

PIONEER Oil Co., Old South Bldg., Boston, Mass.

PLATT & Washburn Refining Co., 15 Broadway, New York, N. Y. "Veedol." (See page 279.)

POLARINE—See Standard Oil Co. of N. Y.

PRIMUS—See Penn Petroleum Co.

PURE Oil Co., First St., & 13th Ave., S., Minneapolis, Minn. "Puritan."

PURE Oil Co., Fifth & Chestnut Sts., Philadelphia, Pa.

PURITAN—See Pure Oil Co.

PURITAN Oil Co., 1218 W. 70th St., Cleveland, O.

PYCNOLEUM—See Belden & Co.

RELIABLE—See General Oil Works Co.

RELIANCE Oil & Grease Co., 1521 Columbus Rd., Cleveland, O. "Euclid," "Magic."

RICHARDSON Lubricating Co., Quincy, Ill. "Liberty."

ROBINSON & Son Co., Wm. C., 32 South St., Baltimore, Md. "Autoline," Robsoco."

ROBSOCO—See Robinson & Son Co.

ROCK—See Magie Bros.

SAWYER Oil Co., Howard B., 65 Long Wharf, Boston, Mass. "Blue Ribbon," "Auto-Use-It."

SHEPPARD, W. S., 21 Lawrence St., Newark, N. J. "Ideal."

SONNEBORN Sons, L., Fulton & Pearl Sts., New York, N. Y. "Amalie."

SOUND PROOF—See Petroleum Products Co.

SPEARE'S Sons Co., Alden, 140 Sixth St., Boston, Mass.

SPEED-OIL—See Drake Oil Co.

STANDARD Oil Co. of N. Y., New York, N. Y. "Polarine."

STAR Oil Co., 440-42 N. Halsted St., Chicago, Ill.

STAR Oil Works, Fidelity Bldg., Buffalo, N. Y.

SULLIVAN Oil Co., 413 Wells St., Chicago, Ill.

SUPERIOR—See Viscosity Oil Co.

SUPERIOR Oil Co., Century Bldg., Cleveland, O.

SUPREME—See Gulf Refining Co.

SUTHERLAND & Co., P., 232 Milk St., Boston, Mass. "Velvet."

SWAN & Co., Alden S., 135 Front St., New York, N. Y. "Swanoleine."

SWAN & Finch Co., 151 Maiden Lane, New York, N. Y. "Atlas."

SWANOLEINE—See Swan & Co.

SWASTIKA—See McLean-Jones Oil & Supply Co.

SWEET, Charles F., 247 State St., Hartford, Conn. "Pathfinder."

TEXACO—See Texas Co.

TEXAS Co., 17 Battery Pl., New York, N. Y. "Texaco."

THERMO—See Haggerty Refining Co.

TIONA Refining Co., Madison Ave. & Belt Ry., Indianapolis, Ind.

TROJAN—See Tropical Oil Co.

TROPICAL Oil Co., W., 70th St. & L. S. & M. S. Ry., Cleveland, O. "Ozark," "Trojan."

TYGERT Co., E. A., 126 N. Front St., Philadelphia, Pa. "Motorlube."

UNDERHAY Oil Co., 276 Franklin St., Boston, Mass.

UNION Petroleum Co., 135 S. Second St., Philadelphia, Pa.

USOLINE—See Oil Products Co.

VACUUM Oil Co., Rochester, N. Y. "Mobiloil."

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OILS (Continued)

LUBRICATING OILS (Continued)

VALVOLINE Oil Co., 11 Broadway, New York, N. Y.

VALVONE—See Belden & Co.

VEEDOL—See Platt & Washburn Refining Co.

VELVET—See Sutherland & Co.

VISCO Motor Oil Co., 2104 Superior Viaduct, Cleveland, O.

VISCOS—See National Oil & Supply Co.

VISCOSITY Oil Co., 1101-03 W. 37th St., Chicago, Ill. "Caspian," "Crystalene," "Franklin," "Visoco," "Zero," "Alaska," "Paramount," "Apex," "Superior," "Magic."

VISOCO—See Viscosity Oil Co.

WADHAMS Oil Co., Milwaukee, Wis. "F. V."

WARREN Refining Co., 1137 W. 11th St., Cleveland, O. "Expert."

WAVERLY Oil Works Co., 54th St. & A. V. R. R., Pittsburg, Pa. "Defiance."

WEINBERG & Co., J. H., 128 Maiden Lane, New York, N. Y. "Bully."

WHALE—See Nye, Wm. F.

WHITE & Bagley Co., Worcester, Mass. "Oilzum." (See Back Cover.)

WHIZOIL—See Hollingshead Co.

WILBURINE Oil Works, 11 Broadway, New York, N. Y.

WINN, Wm. R., 143 Maiden Lane, New York, N. Y.

WOLFS HEAD—See Wolverine Lubricants Co. of N. Y.

WOLVERINE Lubricants Co. of N. Y., 80 Broad St., New York, N. Y. "Packard," "Wolfs Head."

WOOD Co., W. A., 373 Atlantic Ave., Boston, Mass. "Perfection."

YOUKIM—See Young & Kimball.

YOUNG, Orlando W., 277 Halsey St., Newark, N. J.

YOUNG & Kimball, Frank L., 111 Purchase St., Boston, Mass. "Youkim."

ZERO—See Viscosity Oil Co.

ZURN Co., O. F., 2736-38 N. Broad St., Philadelphia, Pa. "Zurnoil."

ZURNOIL—See Zurn Co.

ORNAMENTS

RADIATOR ORNAMENTS

ÆTNA Brass Mfg. Co., 3870-90 Hamilton Ave., Cleveland, O.

BALZER Co., Gus, 1777 Broadway, New York, N. Y.

CRAMP & Sons Ship & Engine Building Co., William, Philadelphia, Pa. (See page 261.)

GOODWIN & Kintz Co., Winsted, Conn.

INTERNATIONAL Silver Co., Meriden, Conn.

NATIONAL Jack & Mfg. Co., 130-34 S. Clinton St., Chicago, Ill.

ROBBINS & Myers Co., Springfield, O.

PACKING

ASBESTOS AND FIBROUS PACKING

AMBESCO—See American Asbestos Co.

AMERICAN Asbestos Co., Norristown, Pa. "Ambesco." (See page 77.)

ASBESTOS & Rubber Works of America, 1790 Broadway, New York, N. Y. "Motobestos." (See page 537.)

ASBESTOS & Rubber Works of New Jersey, Camden, N. J. (See page opposite Inside Back Cover.)

BROWN & Co., Charles D., 140 Washington St., Boston, Mass. (N. Boston). "Vellumoid."

CAREY Co., Philip (Lockland), Cincinnati, O.

CRANDALL Packing Co., Palmyra, N. Y.

DEFENDER—See Woven Steel Hose & Rubber Co.

DEMON—See Hart Packing Co.

EAGLE Oil & Supply Co., Boston, Mass. (See page 277.)

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J. "Motobestos."

ENDURA Mfg. Co., 6306 Eastwich Ave., Philadelphia, Pa.

ESSEX Rubber Co., Trenton, N. J.

GARLOCK Packing Co., Palmyra, N. Y.

GENERAL Asbestos & Rubber Co., Charleston, S. C. (See page 245.)

HART Packing Co., 144 High St., Boston, Mass. "Demon."

HODGART & Co., 122 S. Michigan Ave., Chicago, Ill.

J. M. MOBILENE—See Johns-Manville Co.

JOHNS-MANVILLE Co., H. W., Madison Ave. & 41st St., New York, N. Y. "J. M. Mobilene."

KEASBEY & Mattison Co., Ambler, Pa.

KNOWLTON Rubber Co., Geo. W., 60 Pearl St., Boston, Mass.

MOTOBESTOS—See Asbestos & Rubber Works of America.

MOTOBESTOS—See Empire Rubber & Tire Co.

NATIONAL Asbestos Co., Lena & Armat Sts., (Germantown), Philadelphia, Pa.

STANDARD Brake Lining Co., Gleasondale, Mass.

STAYBESTOS Mfg. Co., (Germantown), Philadelphia, Pa. (See page 57.)

VELLUMOID—See Brown & Co.

WOVEN Steel Hose & Rubber Co., Trenton, N. J. "Defender." (See page 531.)

METALLIC PACKING

(See Gaskets, Metallic)

RUBBER PACKING

BOSTON Belting Co., 84 Linden Park St., Boston, Mass.

BOWERS Rubber Works, 68-70 Sacramento St., San Francisco, Cal.

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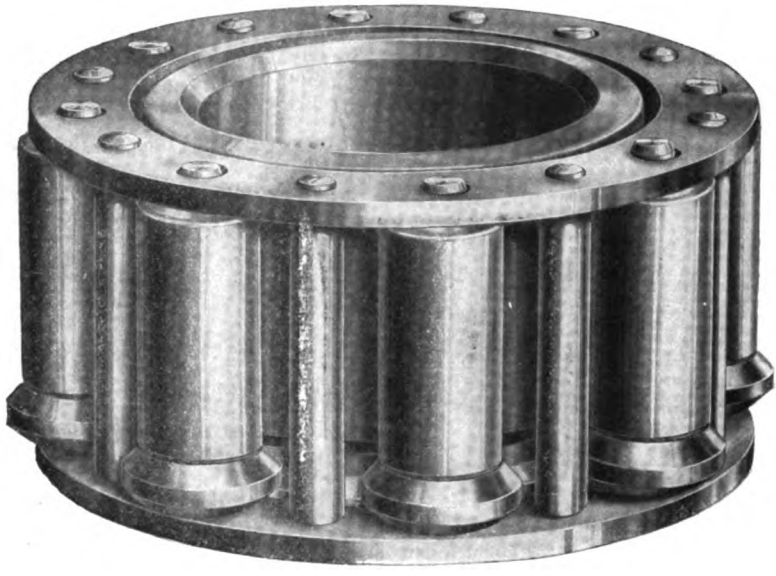

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BOWER ROLLER BEARING CO.

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PACKING (Continued)

RUBBER PACKING (Continued)

CINCINNATI Rubber Mfg. Co., Cincinnati, O. "Royal," "Plymouth," "Sandow." (See page 369.)

CRANDALL Packing Co., Palmyra, N. Y.

EAGLE Oil & Supply Co., Boston, Mass. (See page 277.)

GARLOCK Packing Co., Palmyra, N. Y.

HAMILTON Rubber Mfg. Co., Trenton, N. J. (See page 359.)

HART Packing Co., 144 High St., Boston, Mass.

HOME Tire Co., Trenton, N. J.

KNOWLTON Rubber Co., Geo. W., 60 Pearl St., Boston, Mass.

MANHATTAN Rubber Mfg. Co., Passaic, N. J.

NATIONAL India Rubber Co., Bristol, R. I.

NEW Jersey Car Spring & Rubber Co., Wayne & Brunswick Sts., Jersey City, N. J.

NEW York Belting & Packing Co., 91 Chambers St., New York, N. Y.

PLYMOUTH—See Cincinnati Rubber Mfg. Co.

QUAKER City Rubber Co., 629 Market St., Philadelphia, Pa.

ROYAL—See Cincinnati Rubber Mfg. Co.

REPUBLIC Rubber Co., Youngstown, O.

SANDOW—See Cincinnati Rubber Mfg. Co.

THERMOID Rubber Co., Trenton, N. J. "Vulcanoid." (See page 57.)

VOORHEES Rubber Mfg. Co., 18-46 Bostwick Ave., Jersey City, N. J. (See page 291.)

VULCANOID—See Thermoid Rubber Co.

PADS

LICENSE PADS

(See Numbers, License)

PAINTS

PAINTS AND COLORS

ACME White Lead & Color Works, 1740-1800 St. Aubin Ave., Detroit, Mich.

ARSENAL Varnish Co., Rock Island, Ill.

AULT & Wiborg Co., New, Seventh & Culvert Sts., Cincinnati, O.

BAY STATE—See Wadsworth, Howland & Co.

BESCO—See Buffalo Enamel & Stain Co.

BILCHACO—See Billings-Chapin Co.

BILLINGS-CHAPIN Co., Cleveland, O. "Bilchaco."

BROWN & Co., Joseph M., 31 W. Kinzie St., Chicago, Ill.

BUCKEYE Paint & Varnish Co., 15th & Lucas Sts., Toledo, O.

BUFFALO Enamel & Stain Co., White Bldg., Buffalo, N. Y. "Besco."

BULLS-EYE—See Zinsser & Co.

CAPITOL CITY—See Indianapolis Paint & Color Co.

CHICAGO White Lead & Oil Co., 1454 S. Western Ave., Chicago, Ill. "King."

CINCINNATI Color Co., Eighth & Evans Sts., Cincinnati, O.

CINCINNATI Varnish Co., 211 South St., Cincinnati, O.

DETROIT White Lead Works, 530-60 Milwaukee Ave., E., Detroit, Mich.

DEVOE & C. T. Raynolds Co., F. W., 101 Fulton St., New York, N. Y.

DITZLER Color Co., 18 W. Baltimore Ave., Detroit, Mich.

FELTON, Sibley & Co., 136-40 N. Fourth St., Philadelphia, Pa.

FLINT Varnish Works, Flint, Mich.

FOREST City Paint & Varnish Co., 2324 Lakeside Ave., Cleveland, O.

FRENCH & Co., Samuel H., York Ave., Fourth & Callowhill Sts., Philadelphia, Pa.

GRAVES Co., N. Z., 22-26 S. Third St., Philadelphia, Pa.

HANLINE Bros., Baltimore, Md. (See page 283.)

HEATH & Milligan Mfg. Co., 1825-71 Seward St., Chicago, Ill.

HIGH STANDARD—See Lowe Bros. Co.

HILDRETH Varnish Co., 90 West St., New York, N. Y.

HOFFMAN Paint & Varnish Co., 8 Medford St., Boston, Mass.

INDIANAPOLIS Paint & Color Co., 118 W. Chesapeake St., Indianapolis, Ind. "Capitol City."

JOHNSTON Paint Co., R. F., Cincinnati, O. (See page 155.)

KEYSTONE Paint & Filler Co., Munsey, Pa.

KING—See Chicago White Lead & Oil Co.

LOWE Bros. Co., Dayton, O. "High Standard."

LUCAS & Co., John, 322-30 Race St., Philadelphia, Pa.

MASURY & Son, John W., New York, N. Y.

MOORAMEL—See Moore & Co.

MOORE & Co., Benjamin, 231-33 Front St., Brooklyn, N. Y. "Mooramel."

MOSER Co., Chas., Cincinnati, O.

MOUND City Paint & Color Co., 11th & Mullanphy Sts., St. Louis, Mo.

MURPHY Varnish Co., Chestnut & McWhorter Sts., Newark, N. J.

NELSON Color Co., Amesbury, Mass.

NICE, Eugene E., 272-74 S. Second St., Philadelphia, Pa.

PATTERSON-SARGENT Co., E. 38th & St. Clair Sts., Cleveland, O.

PIERCE Co., F. O., 12 W. Broadway, New York, N. Y.

RICKER-BENNETT Co., 37 Harris St. (N. Cambridge), Cambridge, Mass.

ST. LOUIS Surfacer & Paint Co., Arlington Ave. & Terminal Belt Line, St. Louis, Mo.

SHERWIN-WILLIAMS Co., 100 Canal St., Cleveland, O.

SHRACK & Co., C., 152 N. Fourth St., Philadelphia, Pa.

SMITH & Co., Edward, Sixth St. & West Ave., Long Island City, N. Y.

VALENTINE & Co., 456 Fourth Ave., New York, N. Y.

WADSWORTH, Howland & Co., 84 Washington St., Boston, Mass. "Bay State."

WILHELM Co., A., Third & Bern Sts., Reading, Pa.

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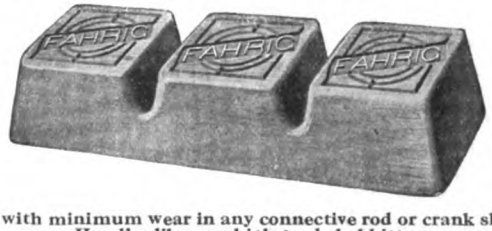

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PAINTS (Continued)

PAINTS AND COLORS (Continued)

WILLEY Co., C. A. (Hunter's Point), New York, N. Y.
(See page 283.)

ZINSSER & Co., W., 195 William St., New York. N. Y. "Bulls-Eye."

ALUMINUM AND BRONZE PAINTS

ALUSTRIUM—See Devoe & C. T. Raynolds Co.

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Slikup."
(See page 133.)

BAER Bros., 25-27 W. Houston St., New York, N. Y.

BILCHACO—See Billings-Chapin Co.

BILLINGS-CHAPIN Co., Cleveland, O. "Bilchaco."

BINSWANGER & Co., B., 829-35 N. Third St., Philadelphia, Pa.

BRONZE Powder Works Co., Elizabeth, N. J. "Ideal," "Vulcan."

CULLEN & Co., F. C., First National Bank Bldg., Chicago, Ill.

DEVOE & C. T. Raynolds Co., F. W., 101 Fulton St., New York, N. Y. "Alustrium."

GENTER Co., J. H., Newburgh, N. Y. "Mirroroide."

GERSTENDORFER Bros., 231 E. 42d St., New York, N. Y. "Sapolin."

IDEAL—See Bronze Powder Works Co.

KEMP Co., W. H., 165 Spring St., New York, N. Y.

MIRROROIDE—See Genter Co.

NUBIAN Paint & Varnish Co., 1856 Le Claire Ave., Chicago, Ill. "Victory."

SAPOLIN—See Gerstendorfer Bros.

SCHLEGEL Mfg. Co., Oscar, 111 E. 12th St., New York, N. Y.

SLIKUP—See Arnold, N. B.

UHLFELDER Co., Leo, 130-32 W. 29th St., New York, N. Y.

VICTORY—See Nubian Paint & Varnish Co.

VULCAN—See Bronze Powder Works Co.

ENAMEL PAINTS

ACME White Lead & Color Works, 1740-1800 St. Aubin Ave., Detroit, Mich.

ADAMS & Elting Co., 718-26 Washington Blvd., Chicago, Ill.

AKRON Varnish Co., Akron, O. "Imperial."

AULT & Wiborg Co., New, Seventh & Culvert Sts., Cincinnati, O.

ARMITAGE & Co., John L., Newark, N. J.

BAY STATE—See Wadsworth, Howland & Co.

BERRY Bros., Detroit, Mich.

BESCO—See Buffalo Enamel & Stain Co.

BILCHACO—See Billings-Chapin Co.

BILLINGS-CHAPIN Co., Cleveland, O. "Bilchaco."

BOYER Chemical Laboratory Co., 8 E. Michigan St., Chicago, Ill.

BUFFALO Enamel & Stain Co., White Bldg., Buffalo, N. Y. "Besco."

CHASE, Roberts & Co., Fifth St. & West Ave., Long Island City, N. Y.

CLEVELAND Varnish Co., 3111 E. 87th St., Cleveland, O.

COLUMBUS Varnish Co., Columbus, O. "Peerless."
(See page 155.)

DETROIT White Lead Works, 530-60 Milwaukee Ave., E., Detroit, Mich.

DEVOE & C. T. Raynolds Co., F. W., 101 Fulton St., New York, N. Y.

ESSEX Varnish Co., 92 Vesey St., Newark, N. J.

FELTON, Sibley & Co., 136-40 N. Fourth St., Philadelphia, Pa.

FLINT Varnish Works, Flint, Mich.

FOREST City Paint & Varnish Co., 3334 Lakeside Ave., Cleveland, O.

GLIDDEN Varnish Co., W. Madison Ave. & L. S. & M. S. Ry., Cleveland, O.

HANLINE Bros., Baltimore, Md.
(See page 283.)

HARDY Paint & Varnish Co., Toledo, O.

IMPERIAL—See Akron Varnish Co.

MASURY & Son, John W., New York, N. Y.

MOLLER & Schumann Co., Marcy & Flushing Aves., Brooklyn, N. Y.

MOUND City Paint & Color Co., 11th & Mullanphy Sts., St. Louis, Mo.

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill.

PEERLESS—See Columbus Varnish Co.

PRATT & Lambert, Buffalo, N. Y.

ROYAL—See Wilhelm Co.

SHERWIN-WILLIAMS Co., 100 Canal St., Cleveland, O.

SOUTH-WEST Paint & Varnish Co., 2006-12 N. Lamar St., Dallas, Tex.

STANDARD Varnish Works (Elm Park), Port Richmond, N. Y.

VALENTINE & Co., 456 Fourth Ave., New York, N. Y.

WADSWORTH, Howland & Co., 84 Washington St., Boston, Mass. "Bay State."

WILHELM Co., Third & Bern Sts., Reading, Pa. "Royal."

EXHAUST PIPE AND MUFFLER PAINTS

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Slikup."
(See page 133.)

ARNSTEIN, Eugene, 46th St. & Wentworth Ave., Chicago, Ill. "Century."

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Sta-On."
(See page 131.)

BULGER Varnish Co., William, 3053 E. 87th St., Cleveland, O.

C. O. T.—See Tingley & Co.

CENTURY—See Arnstein, Eugene.

COLUMBUS Varnish Co., Columbus, O. "Peerless."
(See page 155.)

DURKEE-ATWOOD Co., Minneapolis, Minn. "Rie-Nie."
(See page 131.)

GENTER Co., J. H., Newburgh, N. Y. "Mirroroide."

Complete Index to Classification appears on Pages 8 to 26.

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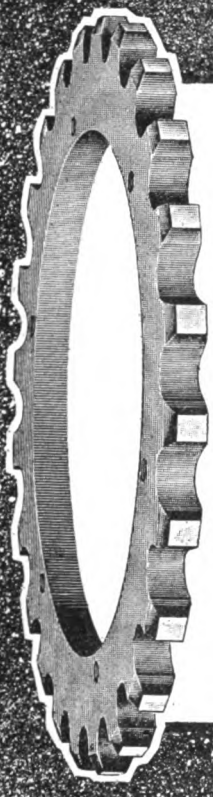

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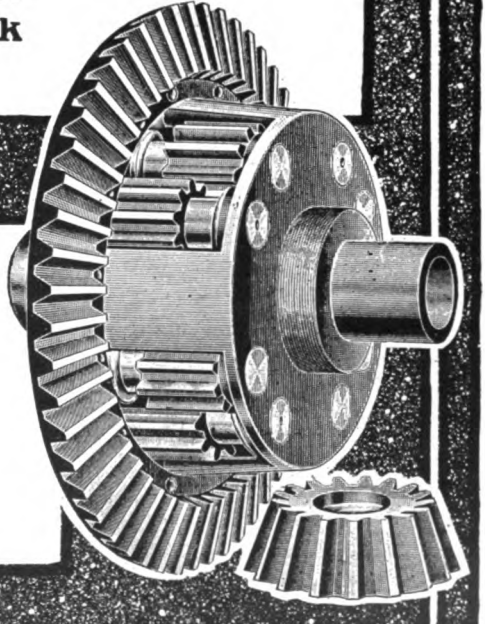

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PAINTS (Continued)

EXHAUST PIPE AND MUFFLER PAINTS (Continued)

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

MIRROROIDE—See Genter Co.

NORTHWESTERN Chemical Co., Marietta, O.
(See page 131.)

PEERLESS—See Columbus Varnish Co.

RIE-NIE—See Durkee-Atwood Co.

SLIKUP—See Arnold, N. B.

STA-ON—See Atlas Auto Supply Co.

TINGLEY & Co., Chas. O., Rahway, N. J. "C. O. T."

VAN TILBURG Oil Co., 2424-28 University Ave., S. E., Minneapolis, Minn. "Wang."

WANG—See Van Tilburg Oil Co.

WONDER WORKER—See Hall-Thompson Co.

WILHELM Co., A., Third & Bern Sts., Reading, Pa. "Royal."

RIM PAINTS

(See also Paints, Aluminum and Bronze; also Paints, Enamel)

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Slikup."
(See page 133.)

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill.
(See page 131.)

BEARDSLEE, J. W., Elmira, N. Y.

COLUMBUS Varnish Co., Columbus, O. "Peerless."
(See page 155.)

C. O. T.—See Tingley & Co.

DURKEE-ATWOOD Co., Minneapolis, Minn. "Rie-Nie."
(See page 131.)

GENTER Co., J. H., Newburgh, N. Y. "Mirroroide."

GRAY Specialty Co., 148 Avon Ave., Newark, N. J.

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

HOLLINGSHEAD Co., R. M., Camden, N. J. "Whiz."

MIRROROIDE—See Genter Co.

NORTHWESTERN Chemical Co. Marietta, O.
(See page 131.)

PEERLESS—See Columbus Varnish Co.

RIE-NIE—See Durkee-Atwood Co.

SLIKUP—See Arnold, N. B.

TINGLEY & Co., Chas. O., Rahway, N. J. "C. O. T."

VAN CLEEF Bros., 7709-11 Woodlawn Ave., Chicago, Ill.

WHIZ—See Hollingshead Co.

WONDER WORKER—See Hall-Thompson Co.

RUBBER PAINTS

(For refinishing rubber mats and matting and painting tires.)

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Slikup."
(See page 133.)

ARNSTEIN, Eugene, 46th St. & Wentworth Ave., Chicago, Ill. "Century."

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Preservo."
(See page 131.)

AUTO Products Co. of America, 116 N. Commercial St., St. Louis, Mo. "Punchs."

BRADLEY & Vrooman Co., Chicago, Ill. "Velvet."

BULL DOG—See Polson Bros. Mfg. Co.

CENTURY—See Arnstein, Eugene.

CHIEFTAIN Mfg. Co., Charleston, W. Va. "Tire-Life."

DURKEE-ATWOOD Co., Minneapolis, Minn. "Rie-Nie."
(See page 131.)

FAULTLESS—See Hawkeye Oil Co.

FRENCH & Co., Samuel H., York Ave., Fourth & Callowhill Sts., Philadelphia, Pa.

GRAY Specialty Co., 148 Avon Ave., Newark, N. J.

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

HAWKEYE Oil Co., Waterloo, Ia. "Faultless."

HOLLINGSHEAD Co., R. M., Camden, N. J. "Whiz."

JEWEL—See Wadsworth-Howland Co.

NARCO TIRENEW—See National Rubber Co.

NATIONAL Cement & Rubber Co., 300-16 S. St. Clair St., Toledo, O.

NATIONAL Rubber Co., 4409 Papin St., St. Louis, Mo. "Narco Tirenew."

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill.

NORTHWESTERN Chemical Co., Marietta, O. "Tire-Lac."
(See page 131.)

POLSON Bros. Mfg. Co., 331 Southwest Blvd., Kansas City, Mo. "Bull Dog."

PRESERVO—See Atlas Auto Supply Co.

PUNCHS—See Auto Products Co. of America.

RIE-NIE—See Durkee-Atwood Co.

RUTHERFORD Rubber Co., Rutherford, N. J.

SAVAGE Tire Co., Main & Sicard Sts., San Diego, Cal.

SECURITY Reliner Co., 33 Meade St., Montgomery, N. Y.

SIMPLEX Auto Specialty Co., 733 Woodward Ave., Detroit, Mich.

SIN-TI Rubber Co., Home Life Bldg., Washington, D. C.

SLIKUP—See Arnold, N. B.

TINGLEY & Co., Chas. O., Rahway, N. J. "Tire Solder."

TIRE-LAC—See Northwestern Chemical Co.

TIRE-LIFE—See Chieftain Mfg. Co.

TIRE SOLDER—See Tingley & Co.

VAN CLEEF Bros., 7709-11 Woodlawn Ave., Chicago, Ill.

VAN TILBURG Oil Co., 2424-28 University Ave., S. E., Minneapolis, Minn. "Wang."

VELVET—See Bradley & Vrooman Co.

WADSFORTH-HOWLAND Co., 225 Carpenter St., Chicago, Ill. "Jewel."

WANG—See Van Tilburg Oil Co.

WHIZ—See Hollingshead Co.

WONDER WORKER—See Hall-Thompson Co

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CUTLER HAMMER Mfg. Co., Milwaukee, Wis.
(See page 191.)

CUTTER Co., Geo., South Bend, Ind.

ELECTRIC Products Co., Cleveland, O.

ELECTRIC Storage Battery & Mfg. Co., Cincinnati, O.

GENERAL Electric Co., Schenectady, N. Y.

LANG Electric Co., J., 423 N. Lincoln St., Chicago, Ill.

LEONARD Electric Co., Ward, Bronxville, N. Y.

METROPOLITAN Electric Mfg. Co., East Ave. & 14th St., Long Island City, N. Y.

WESTERN Electric Co., 463 West St., New York, N. Y.

WOOD PANELS

AMERICAN Veneer Co., 1501 Clinton St., Hoboken, N. J.

DANN Bros. & Co., 80-88 Franklin St., New Haven, Conn.

EMPIRE Panel & Veneer Co., 940 Seneca St., Buffalo, N. Y.

MICHIGAN Veneer Co., Alpena, Mich.

NEW Jersey Veneer Co., 258 W. Railway Ave., Paterson, N. J.

WISCONSIN Seating Co., New London, Wis.

PANS

DRIP PANS

A-Z Co., 530 W. 56th St., New York, N. Y.

AUTO Metal Co., 520 Worthington St., Springfield, Mass.

AVERY Stamping Co., 5209 Lakeside Ave., Cleveland, O.

BADGER & Sons Co., E. B., 63-69 Pitts St., Boston, Mass.

CULLEN-ATKINSON Co., 120 Allyn St., Hartford, Conn. "Hartford."

DOVER Stamping & Mfg. Co., Cambridge, Mass.
(See page 139.)

DURLACH, I., 199-201 Wooster St., New York, N. Y.

HARTFORD—See Cullen-Atkinson Co.

HAYES Mfg. Co., Detroit, Mich.

IDEAL Sheet Metal Works, 2809 Michigan Ave., Chicago, Ill.
(See page 331.)

KOVEN & Bro., L. O., 50 Cliff St., New York, N. Y.
(See page 403.)

LAWSON Co., F. H., Cincinnati, O.

REID Co., 1504 Third Ave., Moline, Ill.

ROCHESTER Can Co., 103-09 Hague St., Rochester, N. Y.

SAGINAW Sheet Metal Works, Saginaw, Mich.

SEXTON Can Co., 223 Franklin St., Boston, Mass.

SMYTH Garage Pan Mfg. Co., Patchogue, N. Y.

TODD Mfg. Co., 820-24 Mary Pl., Minneapolis, Minn.

WORCESTER Pressed Steel Co., Worcester, Mass.
(See page 157.)

DUST PANS OR UNDER BONNETS

A-Z Co., 530 W. 56th St., New York, N. Y.

BADGER & Sons Co., E. B., 63-69 Pitts St., Boston, Mass.

BUNN-HUTCHINSON Co., 2074 E. 22d St., Cleveland, O.

COLUMBUS Auto Brass Co., 767 N. Fourth St., Columbus, O.

DETROIT Auto Specialty Co., 909-11 Greenwood Ave., Detroit, Mich.

IDEAL Sheet Metal Works, 2809 Michigan Ave., Chicago, Ill.
(See page 331.)

KEYSTONE Sheet Metal Co., Ambridge, Pa.

KINSEY Mfg. Co., Toledo, O.

MICHIGAN Stamping Co., 759-71 Bellevue Ave., Detroit, Mich.

MITCHELL & Son, G. F., 6501 Cedar Ave., Cleveland, O.

METAL Auto Parts Co., Industrial Bldg., Indianapolis, Ind.

MOLINE Pressed Steel Co., East Moline, Ill.

MULLINS Co., W. H., 182 Franklin St., Salem, O.

WELDED Steel Barrel Corp., Leib & Wight Sts., Detroit, Mich.

XARDELL Bros Co., 28 Broadway, Utica, N. Y.

PAPER

FRICTION PAPER

(See Frictions, Fibre)

PASTE

HAND PASTE

(See Soaps, Hand)

SOLDERING PASTE

(See Flux, Soldering)

TRIMMERS PASTE

BUCKEYE Paste Co., Columbus, O.

PATCHES

TIRE REPAIR PATCHES

(See also Shoes, Inner Tire; also Sleeves, Tire Repair)

ALDING—See Alsten & Goulding Co.

ALSTEN & Goulding Co., 36 Foster St., Worcester, Mass. "Alding."

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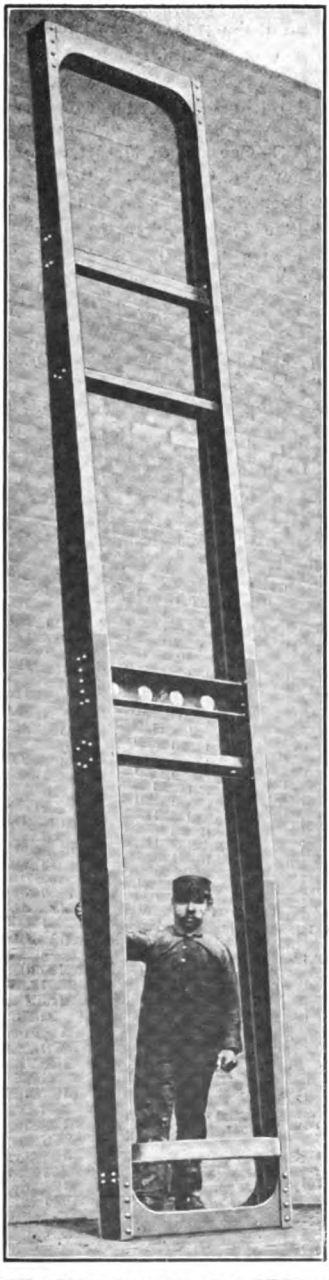
FRAMES



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TIRE REPAIR PATCHES (Continued)

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AMERICAN Tire & Rubber Co., 70-78 Beach St., Akron, O. "Cling-Tite."

BATAVIA Rubber Co., Batavia, N. Y.

BRICTSON Mfg. Co., Brookings, S. Dak.

BUFFALO Rubber Mfg. Co., Sussex Ave. & Erie R. R., Buffalo, N. Y.

BULL DOG—See Polson Bros. Mfg. Co.

CENTURY—See Nemo Chemical & Specialty Mfg. Co.

CHEMI Co., 629 E. Main St., Richmond, Va. "Se-Ment-All."

CLING-TITE—See American Tire & Rubber Co.

CONTINENTAL Rubber Works, Erie, Pa.

DIAMOND Rubber Co., Akron, O.

DOUBLE Fabric Tire Co., 60 W. Ninth St., Auburn, Ind.

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J.

ENDURANCE Tire & Rubber Co., New Brunswick, N. J.

EVERLASTING—See Legnard & Co.

EXCEL Rubber Co., Akron, O.

FALLS Rubber Co., Cuyahoga Falls, O.

FEDERAL Rubber Mfg. Co., Milwaukee, Wis.

FIRESTONE Tire & Rubber Co., Akron, O.

GOODRICH Co., B. F., Akron, O.

GOODYEAR Tire & Rubber Co., Akron, O.

GRAY Specialty Co., 148 Avon Ave., Newark, N. J. "Selbst-Gemacnt."

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

HORSEY Mfg. Co., 6104 Euclid Ave., Cleveland, O.

INDIANA Rubber & Insulated Wire Co., Jonesboro, Ind.

JIFFY—See Johnstown Rubber Co.

JIFFY Specialty Co., McKeesport, Pa.

JOHNSTOWN Rubber Co., Johnstown. Pa. "Jiffy."

K-C—See Western Tire & Rubber Co.

KEYSTONE Rubber Mfg. Co., 125-41 E. 11th St., Erie, Pa.

LEE Tire & Rubber Co., Conshohocken, Pa.

LEGNARD & Co., A. B., Waukegan, Ill. "Everlasting."

LIBERTY Rubber Co., Orange, N. J.

M. & M. Mfg. Co., Akron, O. "Stick-Tite."

MATTSON Rubber Co., Lodi, N. J. (See page 291.)

MANHATTAN Rubber Mfg. Co., Passaic, N. J.

MICHELIN Tire Co., Milltown, N. J.

MILLER Rubber Co., Akron, O.

NATIONAL Cement & Rubber Co., 300-16 S. St. Clair St., Toledo, O.

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill. "Century."

PARKER, Stearns & Co., 286 Sheffield Ave., Brooklyn, N. Y.

PEERLESS Cement Co., 39 Viaduct, Akron, O.

PENNSYLVANIA Rubber Co., Jeannette, Pa.

POLSON Bros. Mfg. Co., 331 Southwest Blvd., Kansas City, Mo. "Bull Dog."

QUAKER City Rubber Co., 629 Market St., Philadelphia, Pa.

QUICK-TITE Patch Co., 20 Market St., Amsterdam, N. Y.

RUBBER Goods Supply & Mfg. Co., Akron, O.

S. H. Mfg. Co., 1761 Broadway, New York, N. Y.

SAVAGE Tire Co., Main & Sicord Sts., San Diego, Cal.

SE-MENT-ALL—See Chemi Co.

SEAMLESS Rubber Co., New Haven, Conn.

SECURITY Co., 30 Shingiss St., Pittsburg, Pa.

SELBST-GEMACHT—See Gray Specialty Co.

STANDARD Rubber & Cable Co., Bridgeport, Conn.

STICK-TITE—See M. & M. Mfg. Co.

TINGLEY & Co., Chas. O., Rahway, N. J.

TYER Rubber Co., Andover, Mass. "Tyrian."

TYRIAN—See Tyer Rubber Co.

UNITED States Tire Co., Broadway & 53th St., New York, N. Y.

VOORHEES Rubber Mfg. Co., 18-46 Bostwick Ave., Jersey City, N. J. (See page 291.)

WESTERN Tire & Rubber Co., 1701-03 Grand Ave., Kansas City, Mo., "K.-C."

WONDER WORKER—See Hall-Thompson Co.

YATMAN Rubber Co., 267-69 Mt. Pleasant Ave., Newark, N. J.

PATTERNS

AUTOMOBILE PATTERN MAKERS

ACME Pattern Co., Grant & Letchworth Sts., Buffalo, N. Y.

ACME Pattern Works, 9 Woodward Ave., Detroit, Mich.

BUFFALO Pattern Works, 13-17 Perry St., Buffalo, N. Y.

EASTERN Pattern Works, 28-32 Wight St., Detroit, Mich.

HARTFORD Pattern & Model Co., 120 Allyn St., Hartford, Conn.

JACOBSEN & Co., K. F., Racine, Wis.

JURACK Pattern Works, Chas., 199-201 Oregon St., Milwaukee, Wis.

LUZIER & Son, T. B., 1641-45 N. Tenth St., Philadelphia, Pa.

MICHIGAN Pattern Works, 1085-89 Jefferson Ave., E., Detroit, Mich.

NESOM & Wenz Co., 22 W. South St., Indianapolis, Ind.

NOBACH Pattern Works, W. J., 522-24 Jackson Blvd., Chicago, Ill.

PEERLESS Pattern Works, 405 E. Madison St., South Bend, Ind.

PHILLIPS, W. H., Cambridge, Mass.

REMMERS Pattern Co., 2121 N. Ninth St., St. Louis, Mo.

STANDARD Pattern Works, 144-46 Fort St. E., Detroit, Mich.

STANDARD Pattern Works Co., 5337 St. Clair Ave., Cleveland, O.

WALKER Bros. Co., 216 Walton St., Syracuse, N. Y.

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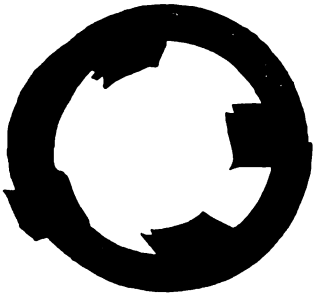

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WEST & Dodge, 334 Atlantic Ave., Boston, Mass.

WHITELEY Bros., 82-84 Church St., New York, N. Y.

PEDALS

HORN AND CUT OUT PEDALS

BARCO Brass & Joint Co., 212-22 W. Illinois St., Chicago, Ill.

CLEVELAND Hardware Co., Cleveland, O.

COX Brass Mfg. Co., Albany, N. Y.
(See page 357.)

DAYTON Malleable Iron Co., Dayton, O.

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

ELECTRIC Horn & Specialty Co., 119 Columbia St., Utica, N. Y. "Oneita."

GABRIEL Horn Mfg. Co., 1407 40th St., N. E., Cleveland, O.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco."
(See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

GRAY-HAWLEY Mfg. Co., 937-43 Jefferson Ave., Detroit, Mich.

MEDINA Stamping & Machine Co., Medina, N. Y.

NATIONAL Jack & Mfg. Co., 130-34 S. Clinton St., Chicago, Ill.

ONEITA—See Electric Horn & Specialty Co.

STAR Brass Works, 1721-23 Baltimore Ave., Kansas City, Mo.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C., B. & Q. R. R., Chicago, Ill.
(See page 293.)

WHITEHOUSE LeCompte Mfg. Co., 42-54 Elm St, Newark, N. J.
(See page 235.)

WIENER-BARNET Co, 312-28 Adams St., Newark, N. J.
(See page 249.)

RATCHET PEDALS

(For locking Brakes, etc.)

GARAGE Equipment Mfg. Co., Milwaukee, Wis.
(See page 83.)

SPECIAL ACCELERATOR PEDALS

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco."
(See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

HACKNEY—See Roller-Bearing Foot Pedal Co.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. "Imperial-Wixon."
(See page 83.)

IMPERIAL-WIXON — See Imperial Brass Mfg. Co.

ROLLER-BEARING Foot Pedal Co., Hackney Bldg., St. Paul, Minn. "Hackney."

PINIONS

METAL AND RAWHIDE PINIONS

(See Gears)

PINS

COTTER PINS

AKRON Machine Co., Akron, O.

AMERICAN Chain Co., Bridgeport, Conn. "Campbell."

BROOKS & Sons, M. S., Chester, Conn.

CAMPBELL—See American Chain Co.

COBB & Drew, Plymouth, Mass.

HINDLEY Mfg. Co., John St., Valley Falls, R. I.

HUBBARD Spring Co., M. D., Pontiac, Mich.
(See page 293.)

JENCKES Mfg. Co., E., 28 Union St., Worcester, Mass.

McWHORTER Mfg. Co., Riverton, N. J.

NATIONAL Screw & Tack Co., Cleveland, O.
(See page 77.)

PICKERING Co., R. S., Sharon Hill, Pa.

SACO—See Smith & Co.

SMITH & Co., F. P., 114 Railroad Ave., Sharon Hill, Pa. "Saco."

WHITMAN & Barnes Mfg. Co., Akron, O.

WIRE Goods Co., 28 Union St., Worcester, Mass.

WIRE Goods Co., Akron, O.
(See page 293.)

ESCUTCHEON PINS

ATLAS Tack Co., Fairhaven, Mass.

BLAKE & Johnson Co., Waterbury, Conn.

CORBIN Screw Corp., 219 High St., New Britain, Conn.

HASSALL, John, Clay & Oakland Sts., Brooklyn, N. Y.
(See page 291.)

MILWAUKEE Tack Co., 27th Ave. & Wahl St., Milwaukee, Wis.

PLUME & Atwood Mfg. Co., 470 Bank St., Waterbury, Conn.

STAR—See Turner & Seymour Mfg. Co.

TURNER & Seymour Mfg. Co., Torrington, Conn. "Star."

WATERBURY Mfg. Co., Waterbury, Conn.

WIRE Goods Co., 28 Union St., Worcester, Mass.

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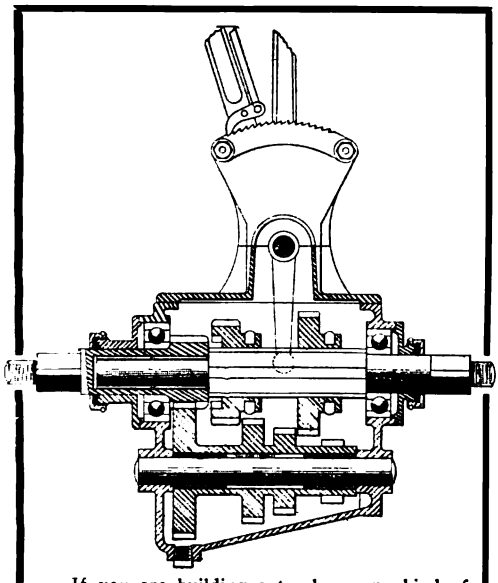

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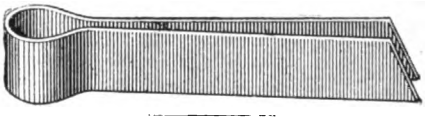

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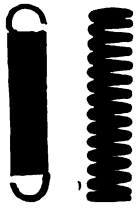

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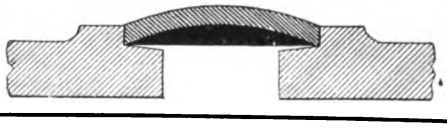
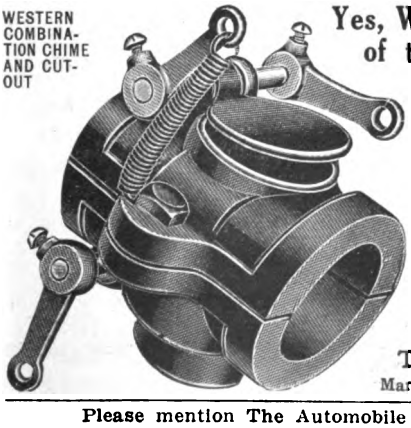


WESTERN COMBINATION CHIME AND CUT-OUT



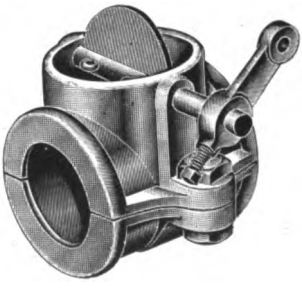
Yes, We Are the Makers of the "Husk" Chime and Valves

Also a full line of Standard Accessories

OUR SPECIALTY
Special Parts for Season Requirements.

TRY US.

"RUDIE" CUT-OUT



THE WESTERN BRASS MFG. WORKS
Marshall Boulevard, 21st Street and C., B. & Q. R.R., CHICAGO, ILL.

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PINS (Continued)

PISTON PINS

ASHLEY Machine Works, 724 University Ave., Rochester, N. Y.
(See page 251.)

SPACKE Machine Co., F. W., Indianapolis, Ind.
(See page 253.)

WAINWRIGHT & Son, W. W., Connersville, Ind.
(See page 309.)

TAPER PINS

CASSADY-FAIRBANK Mfg. Co., 6106-30 La Salle St., Chicago, Ill.

CHICAGO Screw Co., Homan Ave. & Fillmore St., Chicago, Ill.
(See pages 231 and 345.)

CORBIN Screw Corp., 219 High St., New Britain, Conn.

DETROIT Screw Works, Detroit, Mich.
(See page 347.)

FERRY Cap & Set Screw Co., 2151 Scranton Rd., Cleveland, O.

HARTFORD Machine Screw Co., Hartford, Conn.
(See page 301.)

MORSE Twist Drill & Machine Co., New Bedford, Mass.

NATIONAL Sewing Machine Co., Belvidere, Ill.

PRATT & Whitney Co., Hartford, Conn.
(See page 463.)

ST. LOUIS Screw Co., Clarence & Bulwer Aves., St. Louis, Mo.

STANDARD Screw Co., 79 Beacon St., Worcester, Mass.

STANDARD Tool Co., 6900-34 Central Ave., Cleveland, O.

U. S. Automatic Co., Amherst, O.

WESTERN Automatic Machine Screw Co., 750 Lake Ave., Elyria, O.
(See page 351.)

PIPE

WROUGHT IRON AND STEEL PIPE

BYERS Co., A. M., 235 Water St., Pittsburg, Pa.

CRANE Co., 836 S. Michigan Ave, Chicago, Ill.

LA BELLE Iron Works, Steubenville, O.

MARK Mfg. Co., Chicago, Ill.

NATIONAL Tube Co., Frick Bldg., Pittsburg, Pa.

READING Iron Co., Reading, Pa.

SPANG, Chalfant & Co., Union Bank Bldg., Pittsburg, Pa.

YOUNGSTOWN Sheet & Tube Co., Youngstown, O.

PIPING

EXHAUST AND INTAKE PIPING

(See Manifolds, Exhaust)

PISTONS

FINISHED AND MACHINED PISTONS

FERRO Machine & Foundry Co., 47 Hubbard Ave., Cleveland, O.

HARRISBURG Pipe & Pipe Bending Co., Harrisburg, Pa.

HULL Mfg. Co., Lansing, Mich.

MICHIGAN Crank Shaft Co., Lansing, Mich.
(See page 151.)

SHARP Engineering & Mfg. Co., Detroit, Mich.
(See page 309.)

SPACKE Machine Co., F. W., Indianapolis, Ind.
(See page 253.)

SPENCER-SMITH Machine Co., Howell, Mich.
(See page 295.)

WAINWRIGHT & Son, W. W., Connersville, Ind.
(See page 309.)

PLATES

NAME PLATES

AMERICAN Name Plate & Engraving Co., 352 Atlantic Ave., Boston, Mass.

BERNARD Co., J., 422-30 E. 53d St., New York, N. Y.

BLACKINTON & Co., V. H., Attleboro Falls, Mass.

BUCKEYE Iron & Brass Works, 324 E. Third St., Dayton, O.

CHANDLER Co., Napier St., Springfield, Mass.

CHILDS & Co., S. D., 376 W. Monroe St., Chicago, Ill.

COLGAN Co., J. W., Sudbury Bldg., Boston, Mass.

CROWE Name Plate & Engraving Co., Chicago, Ill.
(See page 309.)

ELECTRO-CHEMICAL Engraving Co., 90 West St., New York, N. Y.

ETCHING Company of America, 2526-28 W. Congress St., Chicago, Ill.

GRAMMES & Sons, L. F., Jordan & Union Sts., Allentown, Pa.

GREENDUCK Co., 2127 Tilden Ave., Chicago, Ill.

HAEUSERMANN Metal Mfg. Co., 1098-1102 Brook Ave., New York, N. Y.

HANSON, C. H., 178 N. Clark St., Chicago, Ill.

HENDERSON-AMES Co., Main, Park & Water Sts., Kalamazoo, Mich.

HIGHTON & Sons Co., Wm., Nashua, N. H.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

MAYER Co., Geo. J., 36 S. Meridian St., Indianapolis, Ind.

MULHAUPT, F., Jos., 301-05 N. Fifth St., Lafayette, Ind.

MURDOCK, Jr. Co., Jas., 116 Opera Pl., Cincinnati, O.

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PLATES (Continued)

NAME PLATES (Continued)

NEW York Stencil Works, 100 Nassau St., New York, N. Y.

O'CONNOR, James, Nevada Bldg., Cincinnati, O.

PREMIER Metal Etching Co., 617-21 E. 18th St., New York, N. Y.

ROBBINS Mfg. Co., John, 58 Kneeland St., Boston, Mass.

SHEPARD Mfg. Co., 364 Franklin St., Melrose Highlands, Mass.

SMITH & Co., Jos. N. Detroit, Mich.
(See page 547.)

STAFFORD Co., N., 87 Fulton St., New York, N. Y.

TURNER Brass Works, Sycamore, Ill.

WALTER & Sons, N. C., 3 Park Row, New York, N. Y.

WATSON Co., Mechanics St., Attleboro, Mass.

WHITEFORD & Co., Jos. G., 165 N. Jefferson St., Chicago, Ill.

WRIGHT & Son, Greg. G., 119-21 Opera Pl., Cincinnati, O.

YEUELL Co., E. V., Middlesex Ct., Malden, Mass.

PLATING

BRASS AND NICKEL PLATING

AJAX Plating & Specialty Mfg. Co., 371 Seventh St., Buffalo, N. Y.

AMERICAN Car & Ship Hardware Mfg. Co., Dept. T, New Castle, Pa.
(See page 167.)

B-T-K Gear & Engine Co., 620-30 S. Elliot St., Muncie, Ind.

BERNARD Co., J., 422-30 E. 53d St., New York, N. Y.

BOESCH Lamp Co., 1135 Mission St., San Francisco, Cal.

BOSTON Nickel Plating Co., 160 Portland St., Boston, Mass.

BRIDGEPORT Electro Plate Co., 270 Kossuth St., Bridgeport, Conn.

BRIDGEPORT Metal Goods Mfg. Co., Howard Ave. & Spruce St., Bridgeport, Conn.

BRISKIN Mfg. Co., 539 N. Capitol Ave., Indianapolis, Ind.

CHENEY & Son, S., Manlius, N. Y.

CREUTZ Plating Co., Fifth & Elm Sts., Cincinnati, O.

DETLAFF, A. J., 121 Champlain St., Detroit, Mich.

ERIE Stamping & Mfg. Co., 644-48 W. 12th St., Erie, Pa.

EXETER Brass Works, Exeter, N. H.

FRIES & Co., Buffalo, N. Y.

HILLMAN Auto Supply Mfg. Co., 98 Massachusetts Ave., Boston, Mass.

HOLT & Beebee Co., 51 Chardon St., Boston, Mass.

KEYLESS Lock Co., 1401 Newman St., Indianapolis, Ind.

METROPOLITAN Mfg. Co., 12th St., & G. T. R. R., Detroit, Mich.

NEHLS Plating Works, 248 Brush St., Detroit, Mich.

U. S. Electro-Galvanizing Co., 1-9 Park Ave., Brooklyn, N. Y.

VOELKNER & Harry Mfg. Co., 282-92 Woodbridge St., E., Detroit, Mich.

WHITEHOUSE LeCompte Mfg. Co., 42-54 Elm St., Newark, N. J.
(See page 235.)

PLATINUM

(See also Points, Sparking)

AMERICAN Platinum Works, 225-31 N. J. R. R. Ave., Newark, N. J.

BAKER & Co., Newark, N. J.
(See page 307.)

BISHOP & Co., Platinum Works, J., Malvern, Pa.

COMMERCIAL Research Co., Tuckahoe, N. Y.
(See page 307.)

DEE & Co., Thos. J. D., Mallers Bldg., Chicago, Ill.

GOLDSMITH Bros. Smelting & Refining Co., Heyworth Bldg., Chicago, Ill.

PLATT, C. S., 29 Gold St., New York, N. Y.

ROESSLER & Hasslacher Chemical Co., 100 William St., New York, N. Y.
(See page 307.)

PLIERS

TIRE REPAIR PLIERS

ERICKSON & Son, P. E., Port Chester, N. Y.

NATIONAL Cutlery Co., Westmoreland & Boudinot Sts., Philadelphia, Pa.

PLUGS

CHARGING PLUGS AND RECEPTACLES

ANDERSON Mfg. Co., Albert & J. M., 289 A St., Boston, Mass.

GENERAL Electric Co., Schenectady, N. Y.

LANG Electric Co., J., 423 N. Lincoln St., Chicago, Ill.

RUSSELL & Stoll Co., 48 Cliff St., New York, N. Y.

WESTINGHOUSE Electric & Mfg. Co., (E. Pittsburg), Pittsburg, Pa.

CORE HOLE PLUGS

HUBBARD Spring Co., M. D., Pontiac, Mich.
(See page 293.)

SPARK PLUGS

A. C.—See Champion Ignition Co.

A-Q—See All-And-Co.

Complete Index to Classification appears on Pages 8 to 26.

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CHAMPION SPARK PLUGS

Champion X
Special ½ inch
Price 75c
Factory equipment
on all FORD CARS
since 1911
Gun Metal Finish

CHAMPION SPARK PLUGS

Champion Regular
½ inch
Price $1.00
Factory equipment
on all STUDE-
BAKER CARS
Factory equipment
on all 1914
OVERLAND CARS
Nickel finish

When ordering spark plugs it is well to remember that your customer should have the plug that has proven best for his particular use.

Do you realize that nearly every one of your customers receives his car with CHAMPION SPARK PLUGS in the cylinders and should always replace with them to get the best running condition?

Over 75% of all the cars made this year are leaving the factory equipped with CHAMPION PLUGS.

CHAMPION SPARK PLUGS go to your customer insured. If there is any defect whatsoever, we want to know it and we are always willing to make good our guarantee which covers everything. We put the worth of our product right up to the user.

OUR GUARANTEE

All CHAMPION PLUGS are guaranteed to give absolute satisfaction or full repairs or replacement will be made.

On this page you see illustrated the standard CHAMPION PLUGS. CHAMPION X for Fords (the same as furnished to the Ford Company), CHAMPION Regular ½-inch (the same as furnished the Studebaker Company and the Overland Company for 1913-14), CHAMPION One-Piece Heavy Stone (the same as furnished the Overland Company for 1915), and the regular CHAMPION ⅞"-18 for Maxwell (the same as furnished the Maxwell Company).

"Toledo Made for the Whole World's Trade"

Champion Regular
⅞-18
Price $1.00
Factory equipment
on
MAXWELL CARS
Nickel finish

Champion One-Piece
Heavy Stone
½ inch, ⅞-18 &
Metric
Price $1.25
Factory equipment
on 1915
OVERLANDS
Especially made
for racing cars.
Extra heavy ma-
terial throughout.
Absolutely com-
pression tight. Gun
Metal finish.

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CHAMPION SPARK PLUGS

Extra Long ½ in. Champion Regular (Metz) $1.00

We show a few of the special CHAMPION PLUGS. The extra long ½" for the Metz, the long ⅞"-18 Conical, the CHAMPION INDESTRUCTIBLE HEAVY STONE PLUG and the CHAMPION HEAVY MOTORCYCLE PLUG, the latest addition to our line.

Our especially built plugs are made to work in perfect unison with some particular motor condition. These plugs have passed the most severe factory test and are exclusively specified and used by the largest car manufacturers in the world, Ford, Studebaker, Maxwell, Overland, Metz and over fifty other well-known makers of motor cars.

On the fourth page of this insert you will find a list of all the American and foreign cars, showing the CHAMPION PLUG, which you are absolutely safe in recommending for each particular motor.

The Champion Priming Plug is a ready seller during the winter. Will start any motor on the first quarter turn. Every Ford owner is a possible purchaser. The only priming plug nationally advertised in such publications as the Saturday Evening Post, Literary Digest, and others.

With more than three-fourths of the cars made Champion equipped at their factory, with Champion the only plug so widely nationally advertised, with Champion Plugs absolutely guaranteed to you and your customer, is there any question in your mind what make plug you can do the most business in and make the most profit from? You are absolutely safe in stocking a full line of CHAMPION PLUGS.

You can exchange at full cost allowance any one type Champion for any other in accordance with the demand in your particular territory.

Champion Porcelains combine to the highest degree the two all important qualities, Electrical Strength (Puncture proof), Mechanical Strength (toughness).

We now manufacture and market all spark plugs and terminals formerly made by the Jeffery-De Witt Co. of Detroit, Mich.

Long ⅞—18 Champion Regular (Buick) $1.00

Champion Priming Plug, ½-in., ⅞-18, Metric, $1.25.

⅞—18 Champion Heavy Stone $1.25

½ in. ⅞—18 Metric Champion Motorcycle $1.00

X 35c | Regular 40c | Conical 40c

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CHAMPION SPARK PLUGS

Metric Motorcycle Mica

⅞-18 S. A. E. Champion Mica

CHAMPION MICA PLUGS represent the highest pinnacle of Mica Plug building. The core is of the very finest quality of pure India Mica doubly insulated and laterally wound center tube and washers assembled under heavy pressure. The general construction of the compression chamber electrodes, insulation, etc., is that of the regular CHAMPION, proved in service. The MICA PLUG is guaranteed against short circuit or other defect for one year. CHAMPION MICA PLUGS may be had in all types and threads.

1915 PRICES TO THE TRADE.

		EACH IN LOTS OF Less than 100	100	1000	List
FORD					
Champion "X" Plugs	½ in.	$0.35	$0.33	$0.30	$0.75
STUDEBAKER					
Champion Regular Plugs	½ in.	.40	.38	.35	1.00
MAXWELL					
Champion Regular	⅞ 18	.40	.38	.35	1.00
OVERLAND					
Champion One Piece Heavy Stone Plugs (1915)	½ in.	.62	.60	.57	1.25
Champion Regular (1914)	½ in.	.40	.38	.35	1.00
METZ					
Champion Extra Long Plugs	½ in.	.40	.38	.35	1.00
Champion Priming Plugs	½ in.	.62	.60	.57	1.25
Champion Priming Plugs	⅞ 18				
Champion Motorcycle Priming Plugs, all threads					
Champion Regular Plugs	½ in.	.40	.38	.35	1.00
Champion Regular Plugs	⅞ in.				
Champion Regular Long Plugs	½-⅞ in.				
Champion Two Piece Heavy Stone Plugs	½, ⅞-18, metric	.62	.60	.57	1.25
Champion Reliance Magneto Plugs	½, ⅞-18, metric	.75	.70	.65	
Champion Reliance Sparks in Water	¼, ⅞-18 metric	.65	.60	.55	
Champion Conical Plugs	½ in.	.40	.38	.35	1.00
Champion Conical Plugs	⅞ in.				
Champion Mica Plugs	¼ in.				
Champion Mica Plugs	⅞ in.				
Champion Motorcycle Plugs (Mica).					
Champion Motorcycle Plugs (Porcelain).					

Spark Plug Parts, Wrenches, Terminals, Etc.

Champion Heavy Stone Cores	@	$.33 each	$0.60 each
Champion Reliance Magneto Cores, platinum point	@	.50 each	.75 each
Champion Reliance "Sparks in Water" Cores, porcelain or mica	@	.40 each	.60 each
Champion Priming Plug Cores	@	.27 each	.40 each
Champion Cores, Regular and Conical	@	.25 each	.40 each
Champion Mica Cores	@	.25 each	.40 each
Champion Motorcycle Cores	@	.25 each	.40 each
Champion "X" Cores	@	.20 each	.35 each
C. S. P. Priming Plug Wrench	@	2.00 doz.	.25 each
Box of Champion "Becco" Terminals	@	5.00 each	13.75 each
Copper Asbestos Gaskets for Porcelains	@	1.50 perC	.03 each
⅞ 18 and Metric Gaskets	@	.50 perC	.03 each

NOTE—Assorted orders will be billed at full quantity prices, giving dealers same advantage as if orders were for one type. Terms 2% 10 days, 30 days net.

Champion Becco Terminals, simplest, yet most efficient. No soldering. Perfect Contact. No Tools.

C. S. P. PRIMING PLUG WRENCH

Complete Spark Plug Wrench for all styles and sizes of Spark Plugs.

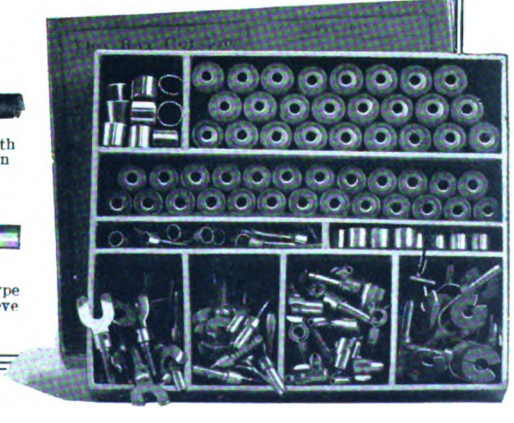
25c

Complete satisfaction to the user is our guarantee

Fits any spark plug or priming plug made

Post Type With Cable Cut Open

Spring Clip Type With Fibre Sleeve



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CHAMPION SPARK PLUGS

SPARK PLUG SIZES FOR ALL MAKES OF CARS

PLEASURE CARS

Abbot-Detroit	Conical	⅞-18
Alco	Heavy Stone	⅞-18
Ames	Heavy Stone	⅞-18
American	Heavy Stone	⅞-18
Apperson	Conical	⅞-18
Auburn	Regular	⅞-18
Austin	Heavy Stone	⅞-18
Belmont	Regular	½"
Briscoe	Regular	⅞-18
Buick	Conical	⅞-18 Long
Cadillac	Heavy Stone	⅞-18
Cameron	Regular	½"
Cartercar	Regular	⅞-18
Case	Regular	⅞-18
Chadwick	Regular	Metric
Chalmers	Heavy Stone	⅞-18
Chandler	Heavy Stone	⅞-18
Chevrolet	Conical	⅞-18 Long
Cole	Conical	⅞-18
Crane	Conical	⅞-18
Crawford	Regular	⅞-18
Continental	Regular	½"
Crow-Elk-Hart	Regular	⅞-18
Davis	Conical	⅞-18
Detroiter	Regular	½" Long
Dispatch	Regular	½"
Dorris	Regular	⅞-18
Empire	Regular	⅞-18
Enger	Regular	⅞-18
Fiat	Heavy Stone	⅞-18
Ford	X	½"
Franklin	Heavy Stone	⅞-18
Garford	Heavy Stone	⅞-18
Gaylord	Regular	½" Long
Glide	Conical	⅞-18
Grant	Regular	⅞-18
Great Southern	Regular	⅞-18
Great Western	Regular	½"
Havers	Regular	½"
Haynes	Conical	⅞-18
Hercules	Conical	⅞-18
Herff-Brooks	Regular	½"
Henderson	Conical	⅞-18
Hudson	Heavy Stone	⅞-18
Hupmobile	Conical	⅞-18
Imperial	Regular	⅞-18
Interstate	Regular	⅞-18
Jackson	Regular	⅞-18
Kearns	Regular	½"
Keeton	Heavy Stone	⅞-18
King	Regular	⅞-18
Kissel Kar	Regular	⅞-18
Kline Kar	Conical	⅞-18
Knox	Heavy Stone	⅞-18
Krit	Regular	½"
Lenox	Regular	⅞-18
Lewis	Regular	½"
Lexington	Regular	⅞-18
Locomobile	Heavy Stone	⅞-18
Lozier	Heavy Stone	⅞-18
Luverne	Conical	⅞-18
Lyons-Knight	Heavy Stone	Metric
McFarlan	Heavy Stone	⅞-18
McIntyre	Heavy Stone	⅞-18
Marathon	Heavy Stone	½"
Marion	Heavy Stone	½" & ⅞-18
Marmon	Heavy Stone	⅞-18
Mason	Regular	½ & ⅞-18
Maxwell	Regular	⅞-18
Mercer	Heavy Stone	⅞-18
Metz	Regular	½-Ex. L.
Michigan	Regular	⅞ Long
Mitchell	Heavy Stone	½"
Moline	Heavy Stone	½"
Moon	Heavy Stone	½"
Monarch	Heavy Stone	⅞-18
National	Heavy Stone	⅞-18
Norwalk	Heavy Stone	½"
Nyberg	Regular	½"
Oakland	Regular	⅞-18
Ohio	Regular	⅞-18
Oldsmobile	Heavy Stone	⅞-18
Overland	Heavy Stone	½"
Packard	Heavy Stone	Metric
Paige Detroit	Regular	⅞-18
Patterson	Regular	⅞-18
Pathfinder	Heavy Stone	⅞-18
Peerless	Heavy Stone	⅞-18
Pierce Arrow	Heavy Stone	⅞-18
Pilot	Regular	⅞-18
Pope Hartford	Conical	⅞-18
Pratt Elkhart	Conical	⅞-18
Premier	Heavy Stone	⅞-18
Pullman	Conical	⅞-18
R. C. H.	Regular	½"
Rayfield	Regular	½"
Regal	Regular	½"
Reo	Regular	½"
Republic	Conical	⅞-18
Saxon	Regular	⅞-18
Selden	Conical	⅞-18
Simplex	Heavy Stone	Metric
Singer	Regular	⅞-18
Spaulding	Regular	⅞-18
Speedwell	Heavy Stone	⅞-18
Staver	Regular	⅞-18
Stearns-Knight	Heavy Stone	Metric
Stevens-Duryea	Heavy Stone	½ & ⅞-18
Stoddard Dayton	Regular	⅞-18
Studebaker	Regular	½"
Stutz	Heavy Stone	⅞-18
Universal	Regular	½"
Velie	Heavy Stone	⅞-18
Wahl	Regular	½"
Wescott	Regular	⅞-18
White	Regular	⅞-18
Willys Knight	Heavy Stone	Metric
Winton	Heavy Stone	⅞-18
Zimmerman	Conical	½"
All Foreign Cars	Regular	Metric

COMMERCIAL CARS

Abendroth	Regular	½"
Adams	Regular	⅞-18
Akron-Ideal	Regular	⅞-18
Alco	Heavy Stone	⅞-18
American La France	Heavy Stone	⅞-18
Armeder	Regular	½"
Atterbury	Mica	⅞-18
Auglaize	Regular	½"
Autocar	Conical	⅞-18
Avery	Regular	½"
Barker	Regular	⅞-18
Beck	Regular	⅞-18
Bessemer	Regular	½"
Best	Regular	½"
Blair	Regular	⅞-18
Brennan	Regular	Metric
Brockway	Regular	⅞-18
Brown	Conical	⅞-18
Cass	Conical	½"
Chase	Heavy Stone	½"
Commer	Conical	½"
Commerce	Regular	½"
Croce	Regular	½"
Crown	Regular	½"
Dart	Heavy Stone	½"
Decatur	Regular	⅞-18
Denby	Regular	½"
DeKalb	Heavy Stone	⅞-18
Federal	Heavy Stone	⅞-18
G. J. G.	Regular	⅞-18
G. M. C.	Heavy Stone	⅞-18
Gabriel	Regular	⅞-18
Garford	Heavy Stone	⅞-18
Gramm-Bernstein	Conical	⅞-18
Hart-Kraft	Conical	½"
Harvey	Heavy Stone	⅞-18
Hatfield	Conical	⅞-18
Howe	Regular	⅞-18
Hupmobile	Regular	⅞-18
Hurlbut	Regular	⅞-18
Hydraulic	Conical	⅞-18
I. H. C.	Regular	⅞-18
Ideal	Regular	½"
Indiana	Regular	½"
KaDis	Regular	⅞-18
Kalamazoo	Heavy Stone	⅞-18
Kearns	Heavy Stone	½"
Kelly	Conical	⅞-18
Lauth-Juergens	Regular	⅞-18
Lippard-Stewart	Regular	⅞-18
Little Giant	Regular	½"
Mack, Saurer & Hewitt	Conical	⅞-18
Mais	Conical	⅞-18
Marmon	Conical	⅞-18
Martin	Regular	⅞-18
Menominee	Regular	⅞-18
Mercury	Regular	½" Long
Modern	Regular	½" & ⅞-18
Monitor	Regular	½"
Mason	Regular	½" & ⅞-18
Mora	Regular	½"
Morton	Conical	Metric
Packard	Heavy Stone	Metric
Packers	Regular	½"
Palmers-Moore	Regular	½"
Peerless	Heavy Stone	Metric
Pierce-Arrow	Heavy Stone	Metric
Plymouth	Regular	½"
Progress	Regular	⅞-18
Reo	Regular	½"
Republic	Regular	½"
Rockford	Regular	½"
Rowe	Regular	⅞-18
Royal	Heavy Stone	⅞-18
Sampson	Conical	⅞-18
Sanford	Regular	½"
Sandusky	Regular	½"
Schacht	Regular	⅞-18
Selden	Regular	⅞-18
Service	Conical	⅞-18
Siebert	Regular	½"
Smith-Milwaukee	Regular	⅞-18
Spaulding	Regular	½"
Spoerer	Heavy Stone	⅞-18
Standard	Regular	½"
Steel	Mica	⅞-18
Sternberg	Mica	⅞-18
Stewart	Regular	⅞-18
St. Louis	Regular	½ & ⅞-18
Studebaker	Regular	½"
Sullivan Car	Regular	½"
Tiffin	Regular	⅞-18
U. S.	Regular	⅞-18
Universal	Conical	⅞-18
Utility	Regular	½"
Van	Regular	½"
Kissel	Heavy Stone	⅞-18
Kline	Regular	⅞-18
Knox	Conical	⅞-18
Koehler	Regular	⅞-18
Krebs	Regular	⅞-18
Lambert	Regular	⅞-18
Lange	Regular	⅞-18
Victor	Regular	½"
Vulcan	Regular	½"
Wagenhals	Regular	⅞-18
White	Heavy Stone	Metric
Wichita	Regular	⅞-18
Wilcox Trux	Conical	⅞-18
Willet	Regular	½"
Willys-Utility	Regular	⅞-18

OUR DEALERS' HELPS

This card with six (6) Plugs attached will be sent free to the dealer ordering 100 or more plugs. We have many other dealers' helps which we will be glad to tell you about if you will correspond with us.

CHAMPION SPARK PLUG COMPANY
1010 Avondale Ave.
TOLEDO, OHIO

R. A. STRANAHAN, Pres.
F. D. STRANAHAN, Treas.

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Why the U. S. Government Adopted

THE MASTER SPARK PLUG

Tests

Price $1.00 Each

In bringing the Master Spark Plug to its present state of perfection neither time nor expense was taken into consideration. Those who conducted the tests were kept in total ignorance of the composition and cost of the various materials and therefore each was selected solely on the basis of performance.

The adoption of Master Spark Plugs by the U. S. Government is the final and most convincing evidence of their quality.

Price $1.25 Each

Construction

The Master Spark Plug is heavy and substantial in construction. Its extreme simplicity of design admits of plug being easily taken apart, cleaned and re-assembled many times with no resultant leakage. Its massive insulating core is of a special nature and will withstand strains that are fatal to ordinary porcelains. Fully guaranteed, the Master Spark Plug is not made to suit a price—but to give 100% efficiency. Specify the Master Spark Plug.

GUARANTEE

After using Master Spark Plugs for 30 days, if you are not entirely satisfied with your purchase, money will be refunded, if requested, on return of plugs where purchased.

Established 1873, all work done by the Hartford Machine Screw Co., has been characterized by accurate workmanship and quality material. Today our unequalled manufacturing facilities are an assurance of speed, thoroughness, and efficient service.

Write today for catalog of Automobile Specialties

HARTFORD MACHINE SCREW COMPANY

New York **HARTFORD** **Detroit**

Makers of Electrically Driven Garage Tire Pumps and Screw Machine Products

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PLUGS (Continued)

SPARK PLUGS (Continued)

ACME Sales Co., 237 Jefferson Ave., Detroit, Mich. "Lore."

AJAX—See Champion Spark Plug Co.

ALBRIGHT Ignition Co., Columbus, Ga.

ALDING—See Alsten & Goulding Co.

ALL-AND-CO., Springfield, Mass. "A-Q."

ALL-IN-ONE—See Frontier Specialty Co.

ALSTEN & Goulding Co., 36 Foster St., Worcester, Mass. "Alding."

AMERICAN Coil Co., Foxboro, Mass.

ANCHOR—See Szel Import & Export Co.

ANDERSON Spark Plug Co., 206 N. Holliday St., Baltimore, Md. (See page 311.)

ARROW—See Reflex Ignition Co.

AUBURN—See New York Mica & Mfg. Co.

AUBURN Ignition Mfg. Co., Auburn, N. Y. (See page 365.)

AUTO-MARINE—See Legnard & Co.

AXWELL Equipment Co., 421 Wood St., Pittsburg, Pa.

BEAT-EM-ALL—See Mosler & Co.

BECKLEY-RALSTON Co., Michigan Ave. & Randolph St., Chicago, Ill. "Victor," "Copperhead," "Diamond."

BELVIDERE Screw & Machine Co., Belvidere, Ill.

BENFORD Mfg. Co., Box H, Mt. Vernon, N. Y. "Monarch," "Home Run." (See page 305.)

BENTON Co., L. F., Vergennes, Vt.

BERGIE NATIONAL—See Bergstrom & Sons.

BERGSTROM & Sons, A. N., 1115 Fifth Ave., Rockford, Ill. "Bergie National."

BETHLEHEM—See Silvex Co.

BI-SPARK Plug Co., Toledo, Ia.

BIGSBY-ROTARY Mfg. Co., 7500 Quincy Ave., Cleveland, O. "Vital." (See pages 205 and 305.)

BINGHAM Mfg. Co., 227 Prospect Ave., N. W., Cleveland, O. "Snappon."

BLICKENSDERFER & Co., G. C., Stamford, Conn. "Bulls Eye."

BLITZ—See Randall-Faichney Co.

BOSCH Magneto Co., 223 W. 46th St., New York, N. Y.

BOUGIE-MERCEDES—See Herz & Co.

BREECH-BLOCK—See Mosler & Co.

BROCKETT-GORHAM Co., N. State St., Marion, O. "Bro-Gor."

BRO-GOR—See Brockett-Gorham Co.

BROWN Co., 213 Bellevue Ave., Syracuse, N. Y.

BULLS EYE—See Blickensderfer & Co.

BURNHAM Spark Plug Co., East Edgecomb, Me.

BUSCOBA—See Bush-Scott Co.

BUSH-SCOTT Co., Detroit, Mich. "Buscoba."

CHAMPION Ignition Co., Flint, Mich. "A. C.," "Titan," "Cico."

CHAMPION Spark Plug Co., 1010 Avondale Ave., Toledo, O. "J-D," "Reliance," "Ajax," "Meteor," "Star," "Sta-Rite." (See pages 297, 298, 299 and 300.)

CHARTER & Co., Hoopeston, Ill.

CICO—See Champion Ignition Co.

COMET—See Oakes & Dow Co.

COMMON SENSE—See Splitdorf Electrical Co.

COPPERHEAD—See Beckley-Ralston Co.

CZAR Ignition Co., 539-43 Ellicott St., Buffalo, N. Y.

DAY, Geo. F., 21 Haverhill St., Boston, Mass.

DE LUXE—See Lockwood-Ash Motor Co.

DELTA Mfg. Co., 266 Fabyan Pl., Newark, N. J.

DETROIT—See Simplex Auto Specialty Co.

DIAMOND—See Beckley-Ralston Co.

DOW Mfg. Co., 131 Adams St., Braintree, Mass.

DOXEY, N. D., Elmira, N. Y. "Lightning," "Yexod."

DRAGON—See Silvex Co.

DUPLEX Multi-Spark Plug Co., Devils Lake, N. D. "Maher."

ELGIN Spark Plug & Ignition Co., 21 S. Spring St., Elgin, Ill.

EMPIRE—See Grant Mfg. & Machine Co.

EZEKLEEN—See Perpetual Spark Plug Co.

FAUST Co., H. C., 302 N. Broad St., Philadelphia, Pa. "Panther."

FAW, J. H., 41 Warren St., New York, N. Y. "Red Seal."

FIREFLY—See Sharp Spark Plug Co.

FRANKLIN Machine Co., 770 Franklin Ave., Brooklyn, N. Y.

FRONTIER Specialty Co., Buffalo, N. Y. "All-in-One," "Opto." (See page 305.)

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco." (See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

GOLIATH—See Sharp Spark Plug Co.

GRANT Mfg. & Machine Co., Bridgeport, Conn. "Empire."

GROSSMAN Mfg. Co., Emil, Bush Terminal, Brooklyn, N. Y. "Red-Head."

H. M. S. BULL DOG—See Hartford Machine Screw Co.

HAGSTROM Bros. Mfg. Co., Lindsborg, Kans.

HAMPSHIRE Mfg. Co., Hatfield, Mass. "Wizard," "Rival."

HARTFORD Machine Screw Co., Hartford, Conn. "Master," "H. M. S. Bull Dog." (See page 301.)

HECO—See Heinze Electric Co.

HEINZE Electric Co., Lowell, Mass. "Heco." (See page 479.)

HEL-FI—See Motor Accessories Mfg. Co.

HERZ & Co., 245 W. 55th St., New York, N. Y. "Bougie-Mercedes." (See page 311.)

HOME RUN—See Benford Mfg. Co.

Complete Index to Classification appears on Pages 8 to 26.

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of the following brands:

SPIT FIRE
VESUVIUS
SUPERIOR
S. A. E.
JUNIOR
MOTORCYCLE

will be advertised to the consumer by a new and novel method

All the leading jobbers have taken the tip and are cataloging our full line for this year

FREE UPON REQUEST

Latest published edition of a card listing size plug used in every car

Write for our proposition

A Word to the Wise Is Sufficient. *Do It Now!*

A. R. MOSLER & CO., Box M, MT. VERNON, N. Y.

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PLUGS (Continued)

SPARK PLUGS (Continued)

HOT SHOT—See K-W Ignition Co.

IDEAL Switch Co., Plainville, Conn.

J-D—See Champion Spark Plug Co.

J-M—See Johns-Manville Co.

JEWELL—See Pittsfield Spark Coil Co.

JIFFY Specialty Co., McKeesport, Pa.

JOHNS-MANVILLE Co., H. W., Madison Ave. & 41st St., New York, N. Y. "J-M."

JOHNSON Bros., 803 Downing St., Denver, Colo.

K-W Ignition Co., 2833 Chester Ave., Cleveland, O. "Vim," "Hot Shot."

KALBFELL & Co., C. J., 608 S. Dearborn St., Chicago, Ill. "Radium."

KINGSTON—See Kokomo Electric Co.

KINSEY Mfg. Co., Toledo, O.

KNOBLOCK-HEIDEMAN Mfg. Co., Sample St. & Vistula Ave., South Bend, Ind.

KOKOMO Electric Co., 1415 Webster St., Kokomo, Ind. "Kingston."

LEADER—See Long Bros.

LEGNARD & Co., A. B., Waukegan, Ill. "Auto-Marine."

LEHMAN Mfg. Co., J. H., 727 Seventh Ave., New York, N. Y.

LIGHTNING—See Doxey, N. D.

LIGHTNING—See Reflex Ignition Co.

LIGHTNING KID—See Reflex Ignition Co.

LION—See Rex Ignition Mfg. Co.

LOCKWOOD-ASH Motor Co., Horton & Main Sts., Jackson, Mich. "De Luxe," "Never Miss."
(See page 539.)

LONG Bros., Broadway & Buckeye St., Kokomo, Ind. "Leader," "Ramble."

LONG Distance Spark Plug Co., 212 S. Illinois St., Indianapolis, Ind.

LORE—See Acme Sales Co.

LYNGAAS, Chas. F., 253 Broadway, New York, N. Y. "Lynx."

LYNX—See Lyngaas, Chas. F.

M. C. D.—See McDowell, L. A.

McCORMICK Mfg. Co., First & Sears Sts., Dayton, O.

McDOWELL, L. A., Luverne, Minn. "M. C. D."

MAHER—See Duplex Multi-Spark Plug Co.

MASTER—See Hartford Machine Screw Co.

METER—See Champion Spark Plug Co.

METZGER, C. A., 13 Canal Pl., New York, N. Y. "Soot Proof."

MIKA—See V-Ray Co.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Victor."
(See page 449.)

MONARCH—See Benford Mfg. Co.

MOSLER & Co., A. R., Box M, Mt. Vernon, N. Y. "Spit Fire," "Triumph," "Beat-em-all," "Breech-Block," "Vesuvius," "Superior."
(See page 303.)

MOTOR Accessories Mfg. Co., Station X., Marshalltown, Ia. "Hel-Fi."
(See page 491.)

NEVER MISS—See Lockwood-Ash Motor Co.

NEW York Mica & Mfg. Co., Auburn, N. Y. "Auburn," "Wright."

OAKES & Dow Co., 15 Chardon St., Boston, Mass. "Comet," "Sootless."

OPTO—See Frontier Specialty Co.

OVERLAND Spark Plug Co., Boston, Mass.

PANTHER—See Faust Co.

PECO—See Power & Efficiency Co.

PEERLESS—See Toledo Spark Plug Mfg. Co.

PEERLESS Piston Ring Co., 95-107 Lafayette St., Newark, N. J.

PERFECTION Specialty Mfg. Co., 115-17 W. Second Ave., Cincinnati, O.

PERFEX—See Samson Electric Co.

PERPETUAL Spark Plug Co., 330 E. Drinker St., Dunmore, Pa. "Ezekleen."

PITTSFIELD Spark Coil Co., Dalton, Mass. "Jewell."
(See page 127.)

POWER & Efficiency Co., American & Mech. Bldg., Trenton, N. J. "Peco."

R-M.—See Randall-Miller Co.

RADIUM—See Kalbfell & Co.

RAJAH Auto-Supply Co., Bloomfield, N. J.
(See page 311.)

RAMBLE—See Long Bros.

RANDALL-FAICHNEY Co., Boston, Mass. "Blitz."

RANDALL-MILLER Co., 93 Massachusetts Ave., Boston, Mass. "R-M."

RED-HEAD—See Grossman Mfg. Co.

RED SEAL—See Faw, J. H.

RED SHIELD—See Wesco Supply Co.

REFLEX Ignition Co., 211 High Ave., Cleveland, O. "Arrow," "Lightning," "Lightning Kid."

RELIANCE—See Champion Spark Plug Co.

REX Ignition Mfg. Co., 1779 Broadway, New York, N. Y. "Lion."
(See page 305.)

RIVAL—See Hampshire Mfg. Co.

ROSCO—See Rosen & Co.

ROSEN & Co., A. W., 610-14 Broadway, New York, N. Y. "Rosco."
(See page 139.)

SAMSON Electric Co., Canton, Mass. "Perfex."

SEE-DIG—See Superior Motor Specialty Co.

SHARP Spark Plug Co., 3343 Broadview Rd., Cleveland, O. "Firefly," "Goliath."

SILVEX Co., 171 Madison Ave., New York, N. Y. "Bethlehem," "Dragon."

SIMPLEX Auto Specialty Co., 733 Woodward Ave., Detroit, Mich. "Detroit."

SIOUX City Machine & Tool Co., First & Virginia Sts., Sioux City, Ia.

SNAPPON—See Bingham Mfg. Co.

SOOT PROOF—See Mezger, C. A.

SOOTLESS—See Oakes & Dow Co.

SPEEDWAY Plug Co., 1506 Harrison Ave., Cincinnati, O.

SPIT FIRE—See Mosler & Co.

SPLITDORF Electrical Co., Newark, N. J. "Common Sense."
(See page 161.)

STA-RITE—See Champion Spark Plug Co.

STAR—See Champion Spark Plug Co.

SUPERIOR—See Mosler & Co.

SUPERIOR Motor Specialty Co., 44 N. Fourth St. Philadelphia, Pa. "See-Dig."

SURE FIRE—See U. S. Auto Supply Co.

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We know a few manufacturers who strive to make as good a car as money can produce and ingenuity invent.

Then there are others, whose big aim is to make as much money as they can on each sale, regardless of value given or anything else.

You, Mr. Manufacturer, must belong to one of these two classes—there is no go-between.

Is it the latter? If so, then we cannot do business with you. But if you are trying to build a car that will make your name echo through the ages, we respectfully submit for your 1914 consideration

BENFORD'S Monarch Spark Plug

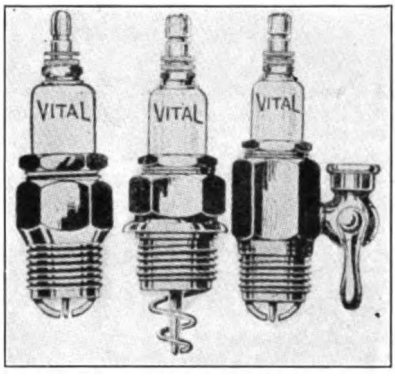
It will add the last touch of perfection to your motor, and will make it run like a top.

Don't take our word for this! Make us show you.

We will gladly submit samples to test. A post card will fetch them.

BENFORD MFG. COMPANY
Box "H" Mt. Vernon, New York

Vital Spark Plugs



Standard	Spiral	Priming
$1.00	$1.00	$1.25

The Big Powerful Plug that gives lasting service and satisfaction. It has solid nickel electrode and contact points. Careful provision for contraction and expansion is made insuring against porcelain breakage resulting from heat.

The Bigsby-Rotary Mfg. Co.
7500 Quincy Ave. Cleveland, O.
Licensed under Canfield Patent No. 612701

REX MEANS KING
This Spark Plug earns the title all right by its performance in service: hot spark, no short circuit, soot-proof.
Made to fit any motor, any thread.
Insist on getting the Rex Lion Plug. Price $1.50

THE REX LION SPARK PLUG
will stand more heat than any other Spark Plug on the market to day. The only Spark Plug that carries an unlimited guarantee, and we will replace, free of charge, any Rex Spark Plug that fuses or corrodes from heat.

Write NOW for our attractive dealer proposition.

REX IGNITION MFG. COMPANY
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"ALL-IN-ONE"

PRIMING SPARK PLUG

A Perfect Spark Plug
Perfect Priming Device

THE "ALL-IN-ONE" SPARK PLUG is the result of concentrated effort on the part of our organization to turn out the best and most efficient PRIMING PLUG on the market.

PRICE $1.25

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BUFFALO, NEW YORK

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PLUGS (Continued)

SPARK PLUGS (Continued)

SZEL Import & Export Co., 359 Broadway, New York, N. Y. (Importers.) "Anchor."

T. A. D.—See Toledo Auto Devices Co.

THOMASSON Mfg. Co., Portland, Ia.

TITAN—See Champion Ignition Co.

TOLEDO Auto Devices Co., Gardner Bldg., Toledo, O. "T. A. D."

TOLEDO Spark Plug Mfg. Co., Factories Bldg., Toledo, O. "Peerless."

TRIUMPH—See Mosler & Co.

UKO—See Utility Co.

U. S. Auto Supply Co., 182 Grand River Ave., Detroit, Mich. "Sure Fire."

UTILITY Co., 636 W. 44th St., New York, N. Y. "Uko."

V-RAY Co., Marshalltown, Ia. "Mika." (See page 515.)

VESUVIUS—See Mosler & Co.

VICTOR—See Beckley-Ralston Co.

VICTOR—See Milwaukee Auto Specialty Co.

VIM—See K-W Ignition Co.

VITAL—See Bigsby-Rotary Mfg. Co.

VOLCANO Spark Plug Co., Ashland, O.

WASCO—See Washington Automobile Supply Co.

WASHINGTON Automobile Supply Co., Washington, Ill. "Wasco."

WESCO Supply Co., Seventh St. & Clark Ave., St. Louis, Mo. "Red Shield."

WILLIAMS, E. Q., 535-39 S. Clinton St., Syracuse, N. Y.

WIZARD—See Hampshire Mfg. Co.

WRIGHT—See New York Mica & Mfg. Co.

XXX Auto Accessory Co., Springfield, Mass.

YEXOD—See Doxey, N. D.

TIRE REPAIR PLUGS

BATAVIA Rubber Co., Batavia, N. Y.

GOODRICH Co., B. F., Akron, O.

SAMPSON—See Stevens & Co.

STEVENS & Co., 373 Broadway, New York, N. Y. "Sampson." (See page 231.)

TINGLEY & Co., Chas. O., Rahway, N. J.

YATMAN Rubber Co., 267-69 Mt. Pleasant Ave., Newark, N. J.

POCKETS

TRUCK STAKE POCKETS

DAYTON Malleable Iron Co., Dayton, O.

EBERHARD Mfg. Co., 2734 Tennyson Ave., Cleveland, O.

POINTS

SPARKING POINTS

(See also Platinum)

AMERICAN Platinum Works, 225-31 N. J. R. R. Ave., Newark, N. J.

BAKER & Co., Newark, N. J. (See page 307.)

BISHOP & Co. Platinum Works, J., Malvern, Pa.

COMMERCIAL Research Co., Tuckahoe, N. Y. "Comreco." (See page 307.)

COMRECO—See Commercial Research Co.

DRIVER-HARRIS Wire Co., Harrison, N. J. "Ignito."

ELECTRICAL Alloy Co., Morristown, N. J.

HEEREN Bros. & Co., Penn Ave. & Ellesmere St., Pittsburg, Pa.

IGNITO—See Driver-Harris Wire Co.

ROESSLER & Hasslacher Chemical Co., 100 William St., New York, N. Y. (See page 307.)

POLISHES

AUTOMOBILE BODY POLISHES

(See also Soaps, Automobile)

A B C Reviver—See Standard Varnish Works.

A No. One—See International Polish Co.

A-S-K Co., 1932-34 W. Eighth St., Cincinnati, O.

ADAMS Grease & Oil Co., 161 W. 51st St., New York, N. Y. "Apollo."

ADAMS & Elting Co., 718-26 Washington Blvd., Chicago, Ill. "Hy-Pol."

ADVANCE Oil Works, 310-12 Flushing Ave., Brooklyn, N. Y.

ALDER Chemical Co., Mt. Vernon, N. Y. "Star."

AMERICUS Products Co., Detroit, Mich.

APOLLO—See Adams Grease & Oil Co.

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Silkup." (See page 133.)

ARNSTEIN, Eugene, 46th St. & Wentworth Ave., Chicago, Ill. "Century."

ARROW—See Peterson Co.

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. (See page 131.)

AUTO-GLOSS—See Indianapolis Paint & Color Co.

AUTOGLOSS—See Sisk Mfg. Co.

AUTO-KLEAN—See Lucas & Co.

AUTO VAR—See Glazene Co.

AUTOCLEAN—See Bridgeport Wood Finishing Co.

B. P. S.—See Patterson-Sargent Co.

B-BRITE—See Polish Products Co.

BAILEYS—See Crown Mfg. Co.

BAUM'S Castorine Co., 104 N. George St., Rome, N. Y.

BEN-HUR Metal Polish Co., 108 E. Market St., Crawfordsville, Ind.

BLUE RIBBON — See International Metal Polish Co.

BLUE Ribbon Mfg. Co., 27 Baldwin St., (Charlestown), Boston, Mass. "Premium."

BOBRICK Chemical Co., 111-17 S. Garey St., Los Angeles, Cal. "Three X."

BODY-NU—See Nu-Back Mfg. Co.

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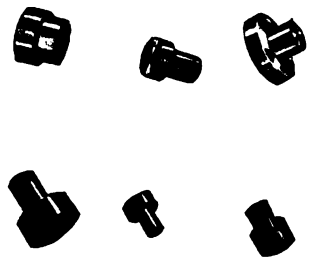

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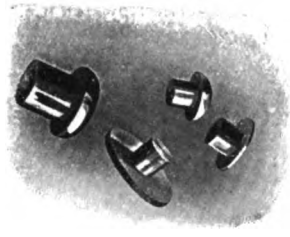

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RIVETS for use as contact points in spark coils and other electrical apparatus requiring a non-oxidising surface. Any styles made to order.
WIRE furnished in all sizes, cut to special length, etc.
We also make Jump Spark Platinum Wires and Platinum Ignition Tubes, and Platinum Work in all forms.

Greatest Output Guarantees Highest Quality at Lowest Prices

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Hudson Terminal, 30 Church St.

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NEWARK, N. J

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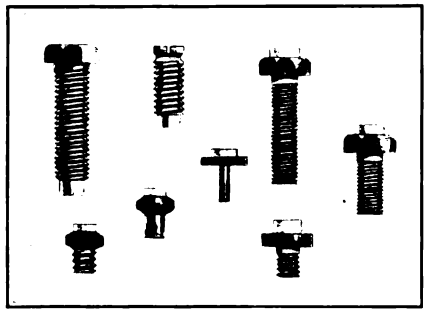

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Any styles made to order to any specifications and of any degree of Hardness.

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MAIN OFFICE,
100 WILLIAM STREET
NEW YORK CITY

F. A. CROSELMIRE,
Manager

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POLISHES (Continued)

AUTOMOBILE BODY POLISHES (Continued)

BORNSCHEIN & Co., John F., 6304 Wallace St., Chicago, Ill. "Schein."

BOYER Chemical Laboratory Co., 8 E. Michigan St., Chicago, Ill.

BRIDGEPORT Wood Finishing Co., New Milford, Conn. "Autoclean."

BRILLIANT—See Werner-Service Mfg. Co.

BROOKS & Co., Clarence, 249-77 Chestnut St., Newark, N. J.

BUFFALO Specialty Co., 375 Ellicott St., Buffalo, N. Y. "Liquid Veneer."

CALLERY & Co., W. W., 188 36th St., Pittsburg, Pa.

CENTURY—See Arnstein, Eugene.

CHICAGO White Lead & Oil Co., 1454 S. Western Ave., Chicago, Ill.

CHIEF KOKOMOKO—See National Products Co.

CINCINNATI Oil Works Co., Cincinnati, O. "Re-Nu."

CLEANOLA Co., Fulton Bldg., Pittsburg, Pa.

COLUMBUS Varnish Co., Columbus, O. "Peerless." (See page 155.)

CORTLAND Specialty Co., 174-78 Railroad St., Cortland, N. Y. "Houts."

CROWN Mfg. Co., Indianapolis, Ind. "Baileys."

CUNNINGHAM—See Pitt Specialty Co.

DAVIS Co., W. C., 237 N. Main St., Brockton, Mass. "Superior."

DIAMOND Specialty Co., Indianapolis, Ind.

DIAMOND Polish Co., Brown Bldg., Washington, Pa.

DOZIT—See Kirk Mfg. Co.

DULEN Mfg. Co., J. E., Springfield, Mo. "Dumaco."

DUMACO—See Dulen Mfg. Co.

DURKEE-ATWOOD Co., Minneapolis, Minn. "Rie-Nie." (See page 131.)

EBERSON Paint Co., 18th & Pine Sts., St. Louis, Mo.

ECLAT Mfg. Co., 3425 S. State St., Chicago, Ill.

EZYBRITE—See Rodriguez, R. E.

FAULTLESS—See Hawkey Oil Co.

FINALINE Mfg. Co., 5027 Delmar Blvd., St. Louis, Mo.

FLINT Varnish Works, Flint, Mich.

FRAZER Lubricator Co., 3921 Normal Ave., Chicago, Ill.

GEM Supply, 1036 S. Main St., Waterbury, Conn.

GLAZENE Co., 1330 W. Jackson Blvd., Chicago, Ill. "Auto Var."

GLISTENER Mfg. Co., 622 Cypress Ave., Kansas City, Mo. "Lee's." "Varnishine."

GOLDEN STAR—See Morris Mfg. Co.

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

HALLETT & Co., H. M., Ludington, Mich. "New Life."

HAWKEYE Oil Co., Waterloo, Ia. "Faultless."

HEANEY Mfg. Co., 164 State St., Boston, Mass.

HOLLINGSHEAD Co., R. M., Camden, N. J. "Nugloss."

HORSEY Mfg. Co., 6104 Euclid Ave., Cleveland, O.

HOUTS—See Cortland Specialty Co.

HY-POL—See Adams & Elting Co.

INDIANAPOLIS Paint & Color Co., 118 W. Chesapeake St., Indianapolis, Ind. "Auto-Gloss."

INTERNATIONAL—See St. Louis Surfacer & Paint Co.

INTERNATIONAL Metal Polish Co., Quill St. & Belt R. R., Indianapolis, Ind. "Blue Ribbon."

INTERNATIONAL Polish Co., 367 Jefferson Ave., Rochester, N. Y. "A No. One."

JEWEL—See Wadsworth-Howland Co.

JIFFY Specialty Co., McKeesport, Pa.

JOHNSON & Son, S. C., Racine, Wis.

KEEP-NEW—See Par-Kop Mfg. Co.

KIRK Mfg. Co., Gumbel Bldg., Kansas City, Mo. "Dozit."

LE DOYEN, Frank J., 827 Mangold St., Baltimore, Md. "Var-Noil."

LEE'S—See Glistener Mfg. Co.

LIGHTNING—See Warren Refining Co.

LIQUID VENEER—See Buffalo Specialty Co.

LORD Polish Co., F. T., 37 Hovey Ave., Cambridge, Mass. 'Sun-Glo."

LUCAS & Co., John, 322-30 Race St., Philadelphia, Pa. "Auto-Klean."

LUSTRE Mfg. Co., 6 N. Clark St., Chicago, Ill.

McDOUGALL Varnish Co., Buffalo, N. Y.

MAGICLEAN—See Schmoeger, Frederic A.

MAJESTIC—See Suydam Co

MARAC Co., 44 E. 23d St., New York, N. Y. "Marvel."

MARATHON—See Weinberg & Co.

MARVEL—See Marac Co.

MATCHLESS—See Standard Oil Co. of N. Y.

MEADOWCROFT Chemical Co., Saybrook, Conn. "Rite Brite."

MODOC Co., Drexel Bldg., Philadelphia, Pa.

MONARCH—See Suydam Co.

MONOGRAM—See New York Lubricating Oil Co.

MONROE Specialty Co., 347 W. Broadway, New York, N. Y. "Sunrise."

MOORE Oil Co., York St. & McLean Ave., Cincinnati, O.

MORRIS Mfg. Co., R. W., Gumbel Bldg., Kansas City, Mo. "Golden Star."

NATIONAL Mfg. Co., 124 N. Edwards St., Kalamazoo, Mich.

NATIONAL Products Co., 8 Courtland Blk., Kokomo, Ind. "Chief Kokomoko."

NAY Chemical Co., Tom, Holden, Mo.

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill. "Relustro."

NEW LIFE—See Hallett & Co.

NEW Method Varnish Co., 210 W. Hudson St., Elmira, N. Y. "Uncle Hiram's."

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POLISHES (Continued)

AUTOMOBILE BODY POLISHES (Continued)

NEW YORK Lubricating Oil Co., 116 Broad St., New York, N. Y. "Monogram."
(See page 633.)

NORTHWESTERN Chemical Co., Marietta, O.
(See page 131.)

NOXAL—See Noxall Polish Mfg. Co.

NOXALL Polish Mfg. Co., 1238 Belmont Ave., Philadelphia, Pa. "Noxal."

NU-BACK Mfg. Co., 114 N. Commercial St., St. Louis, Mo. "Body-Nu."

NUBIAN Paint & Varnish Co., 1856 Le Claire Ave., Chicago, Ill. "Re-Vi-Var."

NUGLOSS—See Hollingshead Co.

ORIENTAL Enamel Co., 963 W. Sixth St., Long Beach, Cal.

OSMACO—See Schlegel Mfg. Co.

PAR-KOP Mfg. Co., 1011 Master St., Philadelphia, Pa. "Keep-New."

PATTERSON-SARGENT Co., E. 38th & St. Clair Sts., Cleveland, O. "B. P. S."

PEERLESS—See Columbus Varnish Co.

PERUVIAN—See Sweet, Charles F.

PETERSON Co., T. J., Lees Bldg., Chicago, Ill. "Arrow."

PIMBLEY Paint & Glass Co., St. Joseph, Mo.

PITT Specialty Co., 1016 Congress St., N. S., Pittsburg, Pa. "Cunningham."

POLISH Products Co., 815-17 E. 21st St., Kansas City, Mo. "B-Brite."

POUGHKEEPSIE Utilities Corp., 3840 Winnikee Ave., Poughkeepsie, N. Y. "Utility."

PREMIUM—See Blue Ribbon Mfg. Co.

PURE Oil Co., First St. & 13th Ave., S., Minneapolis, Minn. "Puritan."

PURITAN—See Pure Oil Co.

RAPID—See Shannon, T. R.

RATH Mfg. Co., Hedley & Richmond Sts., Philadelphia, Pa.

RE-NU—See Cincinnati Oil Works Co.

RELUSTRO—See Nemo Chemical & Specialty Mfg. Co.

RE-VI-VAR—See Nubian Paint & Varnish Co.

RIE-NIE—See Durkee-Atwood Co.

RITE-BRITE—See Meadowcroft Chemical Co.

RODRIGUEZ, R. E., 56-58 Warren St., New York, N. Y. "Ezy Brite."

RUB-ON Mfg. Co., 89 Brayton St., Buffalo, N. Y.

ST. LOUIS Surfacer & Paint Co., Arlington Ave. & Terminal Belt Line, St. Louis, Mo. "International."

SCHEIN—See Bornschein & Co.

SCHLEGEL Mfg. Co., Oscar, 111 E. 12th St., New York, N. Y. "Osmaco."

SCHMOEGER, Frederic A., Sterling, Ill. "Magiclean."

SHANNON, T. R., 19 Lorraine St., Hartford, Conn. "Rapid."

SHINAUTO Mfg. Co., 1422 N. Illinois St., Indianapolis, Ind.

SILCO—See Silvex Co.

SILVEX Co., 171 Madison Ave., New York, N. Y. "Silco."

SISK Mfg. Co., R. J., New London, Conn. "Autogloss."

SLIKUP—See Arnold, N. B.

SPARKLER Mfg. Co., 108 Main St., Fairmount, Ind.

STANDARD Oil Co. of N. Y., New York, N. Y. "Matchless."

STANDARD Varnish Works (Elm Park), Port Richmond, N. Y. "A B C Reviver."

STAR—See Alder Chemical Co.

SUN-GLO—See Lord Polish Co.

SUNRISE—See Monroe Specialty Co.

SUPERIOR—See Davis Co.

SUTHERLAND & Co., P., 232 Milk St., Boston, Mass.

SUYDAM Co., M. B., 61st & Butler Sts., Pittsburg, Pa. "Monarch," "Majestic."

SWEET, Charles F., 247 State St., Hartford, Conn. "Peruvian."

THREE X—See Bobrick Chemical Co.

THUMB, E. W., 872 Orleans St., Chicago, Ill.

TOBEY Furniture Co., Wabash Ave. & Washington St., Chicago, Ill.

U-AUTO-VARNISH Co., 345 The Arcade, Cleveland, O.

ULRICH & Co., E. North & Rose Sts., Buffalo, N. Y. "A-O-K."

UNCLE HIRAM'S—See New Method Varnish Co.

UNO Mfg. Co., 6415-33 E. Ravenswood Pk., Chicago, Ill.

UTILITY—See Poughkeepsie Utilities Corp.

VAN CLEEF Bros., 7709-11 Woodlawn Ave., Chicago, Ill.

VAR-NOIL—See Le Doyen, Frank J.

VARNI-SHINE Co., Columbus, O.

VARNISHINE—See Glistener Mfg. Co.

WADSWORTH-HOWLAND Co., 225 Carpenter St., Chicago, Ill. "Jewel."

WARREN Refining Co., 1137 W. 11th St., Cleveland, O. "Lightning."

WEINBERG & Co., J. H., 128 Maiden Lane, New York, N. Y. "Marathon."

WERNER-SERVICE Mfg. Co., 263 Fairmount Ave., Jersey City, N. J. "Brilliant."

WONDER-MIST Co., 14 Federal St., Boston, Mass.

WONDER WORKER—See Hall-Thompson Co

ZINSSER & Co., W., 195 William St., New York, N. Y.

METAL POLISHES

A. & R. Co., Wallingford, Conn.

A-O-K—See Ulrich & Co.

A-S-K Co., 1932-34 W. Eighth St., Cincinnati, O.

ACME Polish Co., 71 S. 12th St., Pittsburg, Pa. "Ayrolite."

ADAMS & Eiting Co., 718-26 Washington Blvd., Chicago, Ill. "Shinite."

ADVANCE Oil Works, 310-12 Flushing Ave., Brooklyn, N. Y.

AJAX—See Crowell Chemical Co.

AMALIE—See Sonneborn Sons.

AMERICAN—See Harvey Chemical Co.

AMERICAN Metal Polish Co., 89 Winslow Ave., W., West Somerville, Mass. "North Star," "Meyers."

Complete Index Classi[illegible]on appears on Pages 8 to 26.

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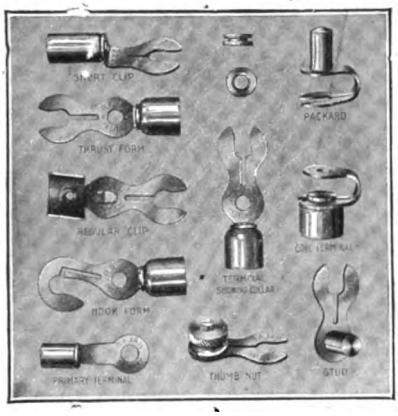

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METAL POLISHES (Continued)

AMERICAN Oil & Disinfectant Co., 196 Water St., New York, N. Y. "Sparrow."

AMERICUS Products Mfg. Co., Detroit, Mich.

ANCHOR—See Hoffman Paint & Varnish Co.

APEX POLISHINE—See Millers Sons Co.

ARCO SPOTZOFF—See Atlantic Refining Co.

ARMIGER Chemical Co., 2155-57 Austin Ave., Chicago, Ill. "Rex."

ARMY & NAVY—See Grady Mfg. Co.

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Slikup."
(See page 133.)

ARNSTEIN, Eugene, 46th St. & Wentworth Ave., Chicago, Ill. "Shine-All."

ARROW—See Peterson Co.

ATLANTIC Refining Co., Euclid Ave. & E. 65th St., Cleveland, O. "Arco Spotzoff."

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Sunshine."
(See page 131.)

AUBURN Specialties Co., 3 N. Green St., Auburn, N. Y. "Blitz."

AUTO Bright Mfg. Co., 210 Main St., Buffalo, N. Y.

AYROLITE—See Acme Polish Co.

B-BRITE—See Polish Products Co.

BAILEYS—See Crown Mfg. Co.

BAR-NIC—See Barcy-Nicholson Co.

BARCY-NICHOLSON Co., 845 Fort St., W., Detroit, Mich. "Bar-Nic."

BAUM'S Castorine Co., 104 N. George St., Rome, N. Y.

BEACON—See Cincinnati Oil Works Co.

BELL—See Reid Mfg. Co.

BELL Mfg. Co., Maine & Gratiot Sts., St. Louis, Mo. "Star."

BELL Oil Co., 53 E. Ferry St., St. Louis, Mo. "Liberty Bell."

BEN Hur Metal Polish Co., 108 E. Market St., Crawfordsville, Ind.

BERTRAMS—See New Jersey Paint Works.

BLACK Silk Stove Polish Works, Sterling, Ill.

BLITZ—See Auburn Specialties Co.

BLUE RIBBON—See International Metal Polish Co.

BLUE Ribbon Mfg. Co., 27 Baldwin St., (Charlestown), Boston, Mass. "Peerless," "Kantburn," "Premium."

BOBRICK Chemical Co., 111-17 S. Garey St., Los Angeles, Cal. "Radium," "E. Z. Q."

BOWMAN-EDSON Co., M. K., 64 Dey St., New York, N. Y. "Edsonia."

BRASS-NU—See Nu-Back Mfg. Co.

BRIDGEPORT Wood Finishing Co., New Milford, Conn. "Metalshine."

BRIGGS & Co., John, 45 Purchase St., Boston Mass. "Hub."

BRITE-LITE—See Pure Oil Co.

BRYT-O—See Clayton-Lindsay Co.

BUFFALO—See Ulrich & Co.

BULLY—See Weinberg & Co.

BURNISHINE—See Paul & Co.

C. P.—See Chicago Polish Co.

CALLERY & Co., W. W., 183 36th St., Pittsburg, Pa. "Winterton."

CAR-BRITE—See Lord Polish Co.

CENTURY—See Davey & Co.

CHAMBERLAIN Co., Sixth Ave. & Grant St., Pittsburg, Pa. "Desolvo."

CHEMICAL Supply Co., 1565 Merwin St., Cleveland, O.

CHICAGO Polish Co., 2715-19 Grand Ave., Chicago, Ill. "C. P."

CHICAGO White Lead & Oil Co., 1454 S. Western Ave., Chicago, Ill.

CHIEF KOKOMOKO—See National Products Co.

CINCINNATI Oil Works Co., Cincinnati, O. "Beacon."

CLAYTON-LINDSAY Co., 352 Central Ave., East Orange, N. J. "Bryt-o."

CLEANER Mfg. Co., 2842 Olive St., St. Louis, Mo. "Polishine."

CLEANOLA Co., Fulton Bldg., Pittsburg, Pa. "Spe-De-Shyne."

COLGAN Mfg. & Supply Co., 42 South St., New York, N. Y. "Peerless," "Crescent."

COLUMBIA—See Stevens, Frederic B.

CORLISS Supply Co., 118 Walnut St., St. Louis, Mo.

CRESCENT—See Colgan Mfg. & Supply Co.

CROWELL Chemical Co., 9 Oxford Terrace, Beverly, Mass. "Oxford," "Ajax."

CROWN Mfg. Co., Indianapolis, Ind. "Baileys."

DAVEY & Co., 2600 Grand Ave., Chicago, Ill. "Puritan," "Century."

DAY Mfg. Co., S. A., Demon St., Buffalo, N. Y. "Zircon."

DESOLVO—See Chamberlain Co.

DETROIT White Lead Works, 530-60 Milwaukee Ave., E., Detroit, Mich. "Rogers."

DIAMOND Polish Co., Brown Bldg., Washington, Pa.

DIAMOND Specialty Co., Indianapolis, Ind.

DIELECTRIC Mfg. Co., 224 S. Vandeventer Ave., St. Louis, Mo.

DOZIT—See Kirk Mfg. Co.

DRAGON—See Paul & Co.

E. Z. Q.—See Bobrick Chemical Co.

EAGLE Oil & Supply Co., Boston, Mass. "Eagleine."
(See page 277.)

EAGLEINE—See Eagle Oil & Supply Co.

EAVENSON & Sons, J., Delaware & Penn Sts., Camden, N. J. "Jesco."

EDSONIA—See Bowman-Edson Co.

ERICKA Mfg. Co., 832 Liberty St., Springfield, Mass. "Shineaul."

ESSEX Paint Works, Essex, Conn.

FAULTLESS—See Hawkeye Oil Co.

FEINER Chemical Mfg. Co., 238 Mill St., Springfield, Mass. "Rub-Less."

FIEBING Chemical Co., 238-40 Reed St., Milwaukee, Wis. "Lusterine."

FIREBALL Gas Tank & Illuminating Co., 5010 Delmar Blvd., St. Louis, Mo.

FORD & DEENEN—See Richmond & Co.

FRAZER Lubricator Co., 3921 Normal Ave., Chicago, Ill.

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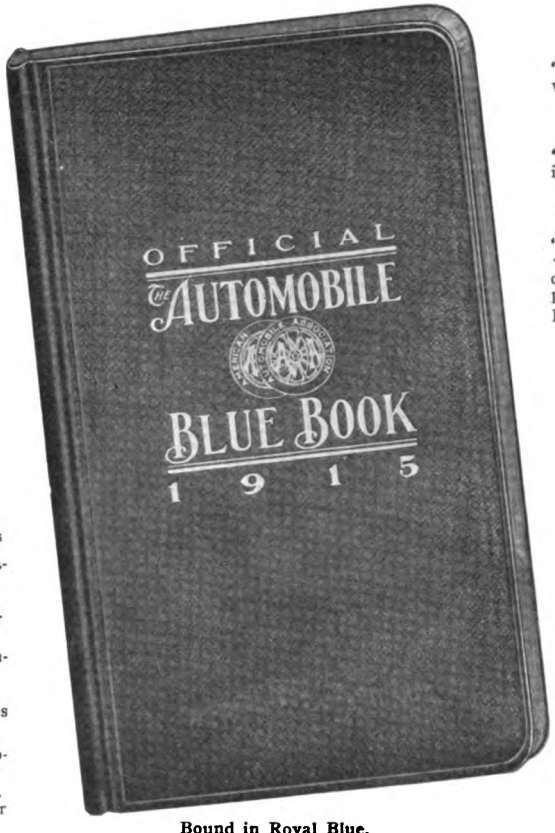

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METAL POLISHES (Continued)

GARRATT-CALLAHAN Co., 37 S. Clinton St., Chicago, Ill.

GERMAN—See Sutherland & Co.

GLAD RAGS—See Silvex Co.

GLISTENER Mfg. Co., 622 Cypress Ave., Kansas City, Mo. "Lee's."

GLITTERSHINE—See Grady Mfg. Co.

GLOBE—See Raimes & Co.

GOLD MEDAL—See Hoffman Co.

GOLDEN GLITTER—See Mooney Co.

GOLDEN SCEPTRE—See Rath Mfg. Co.

GOLDEN STAR—See Morris Mfg. Co.

GOLDSHINE—See Van Tilburg Oil Co.

GRADY Mfg. Co., 250-56 Ely Ave., Long Island City, N. Y. "Glittershine," "Scouree," "Army & Navy."

GREAT Western Oil Co., 2855 E. 37th St., Cleveland, O.

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker," "Nick-E-Lo."

HARRIS Oil Co., A. W., 326 S. Water St., Providence, R. I. "Scouree."

HARVEY Chemical Co., 216 N. Fifth St., La Fayette, Ind. "American."

HAWKEYE Oil Co., Waterloo, Ia. "Faultless."

HEANEY Mfg. Co., 164 State St., Boston, Mass.

HERCULES Chemical Works, 2138 W. Van Buren St., Chicago, Ill. "Non-Such."

HIGHSHINE—See Rath Mfg. Co.

HINDS & Coon, 124-26 Pearl St., Boston, Mass. "Ruby-Rub."

HOFFMAN Co., Geo. Wm., 557 E. Washington St., Indianapolis, Ind. "U. S." "Gold Medal."

HOFFMAN Paint & Varnish Co., 8 Medford St., Boston, Mass. "Anchor."

HOLLINGSHEAD Co., R. M., Camden, N. J. "Whiz."

HUB—See Briggs & Co.

HYGLO—See Stanley, John T.

IMPERIAL—See Rath Mfg. Co.

INDIANAPOLIS Paint & Color Co., 118 W. Chesapeake St., Indianapolis, Ind. "Metal-Brite."

INTERNATIONAL—See St. Louis Surfacer & Paint Co.

INTERNATIONAL Metal Polish Co., Quill St. & Belt R. R., Indianapolis, Ind. "Blue Ribbon."

J-M METALLO—See Johns-Manville Co.

JESCO—See Eavenson & Sons.

JEWEL—See Wadsworth-Howland Co.

JIFFY Specialty Co., McKeesport, Pa.

JOHNS-MANVILLE Co., H. W., Madison Ave. & 41st St., New York, N. Y. "J-M Metallo."

KANTBURN—See Blue Ribbon Mfg. Co.

KETTLER Brass Mfg. Co., 109 Fairview St., Houston, Tex. "Qck Work."

KIRK Mfg. Co., Gumbel Bldg., Kansas City, Mo. "Dozit."

KOSMOS—See Mulliken Oil Co.

LEE'S—See Glistener Mfg. Co.

LIBERTY BELL—See Bell Oil Co.

LIGHTNING Flash Specialty Co., Harrison & Garrard Aves., Cincinnati, O.

LORD Polish Co., F. T., 37 Hovey Ave., Cambridge, Mass. "Lumino," "Car-Brite."

LUMINO—See Lord Polish Co.

LUSTERINE—See Fiebing Chemical Co.

McLEAN-JONES Oil & Supply Co., 40 Indian Wharf, Boston, Mass. "Nox-All."

MACLAREN Imperial Cheese Co., Detroit, Mich. "Redio."

MAGIC—See Sweet, Charles F.

MAGICLEAN—See Schmoeger, Frederic A.

MARATHON—See Weinberg & Co.

MATCHLESS Metal Polish Co., 149 Varick St., New York, N. Y. "Mexoline," "Triploline."

MAXINE—See Rexine Co.

METAL-BRITE—See Indianapolis Paint & Color Co.

METALSHINE—See Bridgeport Wood Finishing Co.

MEXOLINE—See Matchless Metal Polish Co.

MEYERS—See American Metal Polish Co.

MILLER Co., Frank, 349-51 W. 26th St., New York, N. Y.

MILLERS Sons Co., A. D., 3300 Grand Blvd., Pittsburg, Pa. "Apex Polishine."

MODOC Co., Drexel Bldg., Philadelphia, Pa.

MONARCH—See Suydam Co.

MOONEY Co., A. J., 250 Ely Ave., Long Island City, N. Y. "Golden-Glitter."

MOORE Oil Co., York St. & McLean Ave., Cincinnati, O. "Mooreshine."

MOORESHINE—See Moore Oil Co.

MORGAN Mfg. Co., John St., Newport, R. I.

MORRIS Mfg. Co., R. W., Gumbel Bldg., Kansas City, Mo. "Golden Star."

MULLIKEN Oil Co., 200 Friend St., Boston, Mass. "Kosmos."

NATIONAL Cement & Rubber Co., 300-16 S. St. Clair St., Toledo, O.

NATIONAL Mfg. Co., 124 N. Edwards St., Kalamazoo, Mich.

NATIONAL Products Co., 8 Courtland Blk., Kokomo, Ind. "Chief Kokomoko."

NATIONAL Valgrinok Co., 195 Church St., Newton, Mass. "Valgrinok."

NAY Chemical Co., Tom, Holden, Mo.

NEW Era Mfg. Co., Kalamazoo, Mich.

NEW Jersey Paint Works, Tremont & Wayne Sts., Jersey City, N. J. "Bertrams."

NEW YORK Lubricating Oil Co., 116 Broad St., New York, N. Y. (See page 633.)

NICK-E-LO—See Hall-Thompson Co.

NON-SUCH—See Hercules Chemical Works.

NORTH STAR—See American Metal Polish Co.

NORTHWESTERN Chemical Co., Marietta, O. (See page 131.)

NOX-ALL—See McLean-Jones Oil & Supply Co.

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POLISHES (Continued)

METAL POLISHES (Continued)

NOXAL—See Noxall Polish Mfg. Co.

NOXALL Polish Mfg. Co., 1238 Belmont Ave., Philadelphia, Pa. "Noxal."

NOXON Metal Polish Co., 1111 Grand St., Hoboken, N. J.

NU-BACK Mfg. Co., 114 N. Commercial St., St. Louis, Mo. "Brass-Nu."

OIL Products Co., 17 Battery Pl., New York, N. Y. "Usoline."

OSMACO—See Schlegel Mfg. Co.

OXFORD—See Crowell Chemical Co.

PATTERSON Lubricating Co., 114 Broad St., Boston, Mass.

PAUL & Co., J. C., Chicago, Ill. "Burnishine," "Dragon."

PEERLESS—See Blue Ribbon Mfg. Co.

PEERLESS—See Colgan Mfg. & Supply Co.

PENN Petroleum Co., 115-17 N. Second St., Philadelphia, Pa. "Primus."

PETERSON Co., T. J., Lees Bldg., Chicago, Ill. "Arrow."

PIONEER Mfg. Co., 5220 Sweeney Ave., S. E., Cleveland, O. "Shino."

POLESHINE—See Cleaner Mfg. Co.

POLISH Products Co., 815-17 E. 21st St., Kansas City, Mo. "B-Brite."

PREMIUM—See Blue Ribbon Mfg. Co.

PRIMUS—See Penn Petroleum Co.

PURE Oil Co., First St. & 13th Ave., S., Minneapolis, Minn. "Brite-Lite."

PURITAN—See Davey & Co.

PURITAN Soap Co., Rochester, N. Y. (See page 509.)

QCK WORK—See Kettler Brass Mfg. Co.

RADIUM—See Bobrick Chemical Co.

RAIMES & Co., 50 Ferry St., New York, N. Y. "Globe."

RATH Mfg. Co., Hedley & Richmond Sts., Philadelphia, Pa. "Imperial," "Golden Sceptre," "Staraline," "Highshine," "Swiss."

RAYDO—See Ulrich & Co.

RED CROSS—See Robertson & Co.

REDIO—See MacLaren Imperial Cheese Co.

REID Mfg. Co., W. W., 205 Milk St., Boston, Mass. "Bell," "Zip."

RELIABLE Cement Co. (E. Akron), Akron, O.

REX—See Armiger Chemical Co.

REXINE Co., Sheboygan, Wis. "Maxine."

RICHMOND & Co., C. C., 40 Batterymarch St., Boston, Mass. "Ford & Denneen."

ROBERTSON & Co., 1141 W. Madison St., Chicago, Ill. "Red Cross."

ROGERS—See Detroit White Lead Works.

RUB-LESS—See Feiner Chemical Mfg. Co.

RUBY-RUB—See Hinds & Coon.

ST. LOUIS Surfacer & Paint Co., Arlington Ave. & Terminal Belt Line, St. Louis, Mo. "International."

SCHLEGEL Mfg. Co., Oscar, 111 E. 12th St., New York, N. Y. "Osmaco."

SCHMOEGER, Frederic A., Sterling, Ill. "Magiclean."

SCOUREE—See Grady Mfg. Co.

SCOUREE—See Harris Oil Co.

SHINAL—See Adams & Elting Co.

SHINE-ALL—See Arnstein, Geo. W.

SHINE-M-UP—See Simplex Auto Specialty Co.

SHINEAUL—See Ericka Mfg. Co.

SHINITE—See Adams & Elting Co.

SHINO—See Pioneer Mfg. Co.

SILVEX Co., 171 Madison Ave., New York, N. Y. "Glad Rags."

SIMPLEX Auto Specialty Co., 733 Woodward Ave., Detroit, Mich. "Shine-m-up."

SLIKUP—See Arnold, N. B

SOLARINE Co., 153-55 N. Carpenter St., Chicago, Ill.

SONNEBORN Sons, L., Fulton & Pearl Sts., New York, N. Y. "Amalie."

SPARROW—See American Oil & Disinfectant Co.

SPE-DE-SHYNE—See Cleanola Co.

SPEARE'S Sons Co., Alden, 140 Sixth St., Boston, Mass.

STANLEY, John T., 642 W. 30th St., New York, N. Y. "Hyglo." (See page 523.)

STAR—See Bell Mfg. Co.

STARALINE—See Rath Mfg. Co.

STAY-BRIGHT Lacquer Co., 58 W. Washington St., Chicago, Ill.

STEVENS, Frederic B., Detroit, Mich. "Columbia." (See pages 527 and 528.)

SUMMERSHINE Mfg. Co., 250 Ely Ave., Long Island City, N. Y.

SUNSHINE—See Atlas Auto Supply Co.

SUTHERLAND & Co., P., 232 Milk St., Boston, Mass. "German."

SUYDAM Co., M. B., 61st & Butler Sts., Pittsburg, Pa. "Monarch."

SWEET, Charles F., 247 State St., Hartford, Conn. "Magic."

SWISS—See Rath Mfg. Co.

TRAFTON Co., F. M., 176 Federal St., Boston, Mass.

TRIPOLINE—See Matchless Metal Polish Co.

ULRICH & Co., E. North & Rose Sts., Buffalo, N. Y. "A-O-K," "Buffalo," "Raydo."

UKO—See Utility Co.

U. S.—See Hoffman Co.

UNO Mfg. Co., 6415-33 E. Ravenswood Pk., Chicago, Ill.

USOLINE—See Oil Products Co.

UTILITY Co., 636 W. 44th St., New York, N. Y. "Uko."

VALGRINOK—See National Valgrinok Co.

VAN CLEEF Bros., 7709-11 Woodlawn Ave., Chicago, Ill.

VAN Tilburg Oil Co., 2424-28 University Ave., S. E., Minneapolis, Minn. "Wang."

WADSWORTH-HOWLAND Co., 225 Carpenter St., Chicago, Ill. "Jewel."

WANG—See Van Tilburg Oil Co.

Complete Index to Classification appears on Pages 8 to 26.

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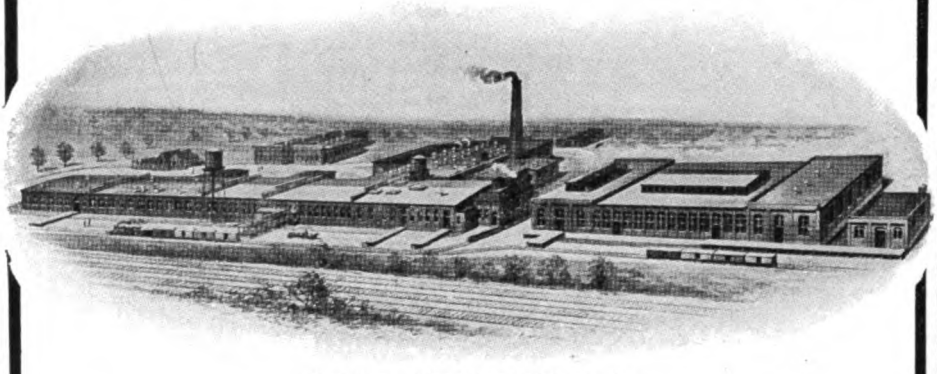
Chase Top Fabrics

For Automobiles & Carriages



The Chase Top Material Factories

The place where reputation dove-tails with quality and price.

Genuine Mohair Mackintosh Cloth
Chase Leather

(The world's standard leather substitute)

Chase Rubber Cloths

It will be worth time and money to you to investigate the CHASE line when purchasing top materials, because our prices are right, quality is unequalled, and we mean to sustain our reputation.

L. C. CHASE & CO.

BOSTON NEW YORK CHICAGO SAN FRANCISCO

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POLISHES (Continued)

METAL POLISHES (Continued)

WARREN Refining Co., 1137 W. 1th St., Cleveland, O.

WEINBERG & Co., J. H., 128 Maiden Lane, New York, N. Y. "Bully," "Marathon."

WHIZ—See Hollingshead Co.

WINN, Wm. R., 143 Maiden Lane, New York, N. Y. "Winnout."

WINNOUT—See Winn, Wm. R.

WINTERTON—See Callery & Co.

WONDER WORKER—See Hall-Thompson Co.

YALE—See Rostand Mfg. Co.

YOUNG, Orlando W., 277 Halsey St., Newark, N. J.

ZIP—See Reid Mfg. Co.

ZIRCON—See Day Mfg. Co.

PORCELAIN

ARTISTIC Porcelain Co., Trenton, N. J.

EMPIRE China Works, 142-56 Green St., Brooklyn, N. Y.

GENERAL Porcelain Co., East Liverpool, O.

HARTFORD Faience Co., Hartford, Conn.

IMPERIAL Porcelain Works, Mulberry St. & New York Ave., Trenton, N. J.

J-D—See Jeffery-DeWitt Co.

JEFFERY-DEWITT Co., 54 Butler Ave., Detroit, Mich. "J-D."
(See page 319.)

NATIONAL Porcelain Co., Trenton, N. J.

STAR Porcelain Co., Trenton, N. J.
(See page 319.)

PRIMERS

GASOLINE ENGINE PRIMERS

(See Heaters, Mixture; also Starters)

A. & G. Mfg. Co., West Newton, Mass.

ATKINS Carbureter Co., Dwight, Ill.

AUTOMATIC Appliance Co., 172 Columbus Ave., Boston, Mass. "Boston."
(See page 383.)

AUTOMATIC Device Co., 551 E. Jefferson St., Frankfort, Ind. "Economy."

BOSTON—See Automatic Appliance Co.

BUCKEYE—See Central Brass & Fixture Co.

BULLOCK Engine Co., 143 N. Wabash Ave., Chicago, Ill. "Irish."

CENTRAL Brass & Fixture Co., N. Fountain Ave., Spingfield, O. "Buckeye."

CHI-FAU-CO—See Chicago Faucet Co.

CHICAGO Faucet Co., 313 S. Clinton St., Chicago, Ill. "Chi-Fau-Co."

COLONIAL Auto & Supply Co., 101 W. 66th St., New York, N. Y.

CONSOLIDATED Gas & Electric Co., 552 W. Lake St., Chicago, Ill. "Economy."

CRARY Co., 650-52 Woodward Ave., Detroit, Mich. "Jiffy."

CRONE, F. G., 334 Genesee St., Buffalo, N. Y.

CRUM-WILEY Mfg. Co., Peru, Ind. "Ideal."

ECONOMY—See Automatic Device Co.

ECONOMY—See Consolidated Gas & Electric Co.

EDGE Auto Device Co., Edgewater Park, N. J. "Neverfail."

EUREKA Primer & Gasoline Saver Co., 1415 S. Harrison St., Fort Wayne, Ind.

GILSON Motor Starting Co., 1407-09 N. Illinois St., Indianapolis, Ind.

HAGSTROM Bros. Mfg. Co., Lindsborg, Kans.

HENDRICKS Ad-A-Man-Tor Co., Grand Rapids, Mich.

HILL-STAGE Co., 604 Jackson St., Anderson, Ind.

HULL Electric Co., R. C., 1822 Euclid Ave., Cleveland, O.

IDEAL—See Crum-Wiley Mfg. Co.

IDEAL—See Interstate Auto Accessory Co.

IDEAL Brass Works, Tenth & Canal Sts., Indianapolis, Ind.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

INDIANA Equipment Co., State Life Bldg., Indianapolis, Ind.

INJEX—See Reflex Ignition Co.

INTERSTATE Auto Accessory Co., 2124 E. Washington St., Indianapolis, Ind. "Ideal."

IRISH—See Bullock Engine Co.

JIFFY—See Crary Co.

KELLOGG Mfg. Co., Rochester, N. Y.
(See page 325.)

KELSEY, F. H., 1841 Euclid Ave., Cleveland, O. "Krank-Less."

KRANK-LESS—See Kelsey, F. H.

KRANK-LESS Co., Citizens Bldg., Cleveland, O.

LYDON Mfg. Co., 514 Michigan Ave., Chicago, Ill.

NATIONAL Mfg. Co., 124 N. Edwards St., Kalamazoo, Mich.

NATIONAL Motor Primer Co., Best Bldg., Rock Island, Ill.

NELSON Mfg. Co., 4529 State St., Chicago, Ill.

NEVERFAIL—See Edge Auto Device Co.

OATHOUT, Chas. M., Saugerties, N. Y.

PERKINS Appliance Co., 539 Worthington St., Springfield, Mass.

PREST-O-LITE Co., 1400 Speedway, Indianapolis, Ind.
(See page 515.)

REFLEX Ignition Co., 211 High Ave., Cleveland, O. "Injex."

VIM Mfg. Co., Clark Ave. & 61st St., Cleveland, O.

WELD Mfg. Co., North Chatham, Mass.

PROPS

CAR PROPS OR SUPPORTS

(See Jacks, Car Supporting)

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PERFECT INSULATION

SEND SAMPLE OR DRAWING FOR QUOTATION

THE STAR PORCELAIN COMPANY
TRENTON, NEW JERSEY

ELECTROLYTE

ABSOLUTELY FREE FROM IMPURITIES, FOR STORAGE BATTERIES OF ALL KINDS

FRANKLIN H. KALBFLEISCH CO.

MANUFACTURING CHEMISTS

Broadway and Sixteenth Street
NEW YORK

JD JEFFERY-DEWITT CO. DETROIT, MICH.

REG. U.S. PAT. OFF.

PORCELAINS

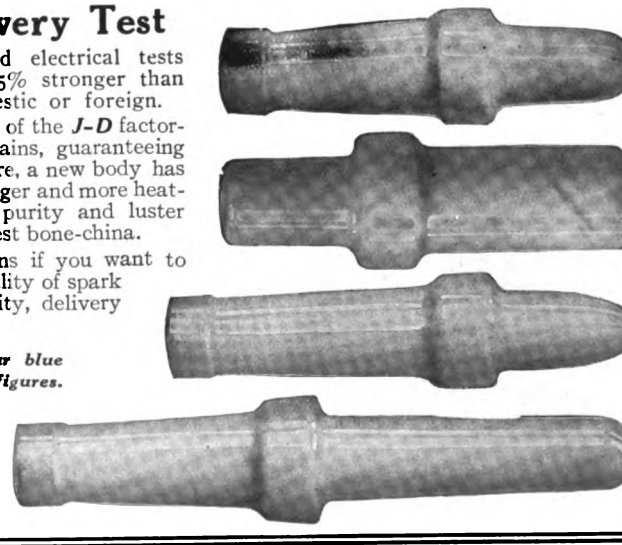
Best—By Every Test

Heat, breakage, and electrical tests prove *J-D* porcelain 25% stronger than any other make, domestic or foreign.

The annual capacity of the *J-D* factories is 20 million porcelains, guaranteeing deliveries. Furthermore, a new body has been created even stronger and more heat-resisting, and with a purity and luster comparable only to finest bone-china.

Specify *J-D* porcelains if you want to produce the highest quality of spark plugs. Quantity, quality, delivery and price are right.

Let us study your blue prints and submit figures.



Jeffery-Dewitt Company
54 Butler Avenue
DETROIT, U. S. A.

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PROTECTORS

SLEEVE AND CUFF PROTECTORS

ATLAS Specialty Mfg. Co., 219-21 N. Michigan Ave., Chicago, Ill.

B. E. Mfg. Co., 444 Broadway, New York, N. Y.
(See page 97.)

GORDON Co., J. P., 272 N. Fourth St., Columbus, O.

NIAGARA Fabric Mfg. Co., 524 W. 50th St., New York, N. Y.

TIRE PROTECTORS

(See Treads, Detachable; also Shoes, Inner Tire)

PULLEYS

PULLEYS AND SHEAVES

(See Sheaves and Pulleys)

PUMPS

ENGINE DRIVEN TIRE PUMPS

A.B.C.—See Artizan Brass Co.

ADVANCE Machinery Co., 517-29 Hamilton St., Toledo, O. "Aero."

AERO—See Advance Machinery Co.

ARTIZAN Brass Co., 218 N. Jefferson St., Chicago, Ill. "A.B.C."

AUTO Air-Rotor Co., 10 Garden St., Auburn, N. Y. "Ten-Eyck."

B. B.—See Herz & Co.

BROWN Co., 213 Bellevue Ave., Syracuse, N. Y.

COE-STAPLEY Mfg. Co., 1565 Railroad Ave., Bridgeport, Conn. "Kinney."

COLSTAD Sales Co., 48 Binford St., Boston, Mass.

DAVIS Mfg. Co., D. L., 733 Marquette Bldg., Chicago, Ill.
(See page 499.)

DEWEY-ANDERSON Mfg. Co., 456 Woodruff Ave., Toledo, O.
(See page 325.)

E-Z—See Wheaton & Co.

FOLBERTH Auto Specialty Co., Lake Ave. & W. 80th St. N. W., Cleveland, O.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco."
(See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

GENERAL Tool Co., 59 Terrace St., Buffalo, N. Y. "Spencer."

GENERAL Utility Co., 1326-30 Ogden St., Philadelphia, Pa.

GREEN & Swett Co., 737 Boylston St., Boston, Mass. "Tri-Phoon."

HANNA—See Troy Auto Specialty Co.

HANS Motor Equipment Co., La Crosse, Wis.

HARTFORD Machine Screw Co., Hartford, Conn. "Master."
(See page 301.)

HERT Mfg. Co., Indianapolis, Ind. "Purair."

HERZ & Co., 245 W. 55th St., New York, N. Y. "B. B.," "Tandem."
(See page 311.)

HILL Pump Valve Co., 18-20 E. Kinzie St., Chicago, Ill. "Utility."

KELLOGG Mfg. Co., Rochester, N. Y.
(See page 325.)

KENMORE Mfg. Co., 15 N. Crawford Ave., Chicago, Ill.

KINGSTON—See Kokomo Electric Co.

KINNEY—See Coe-Stapley Mfg. Co.

KOKOMO Electric Co., 1415 Webster St., Kokomo, Ind. "Kingston."

LIPMAN Air Appliance Co., Beloit, Wis.

M-P—See National United Service Co.

M. & L.—See McCarrell & Hawley.

MANZEL Bros. Co., 320 Babcock St., Buffalo, N. Y.
(See page 321.)

MARVEL Auto Supply Co., 1220 W. Sixth St., Cleveland, O.

MASTER—See Hartford Machine Screw Co.

MAYO Mfg. Co., 58 E. 18th St., Chicago, Ill.
(See page 325.)

MEDINA Machine Co., Medina, O.

NATIONAL Motor Supply Co., 5606 Euclid Ave., Cleveland, O.

NATIONAL United Service Co., Detroit, Mich. "M-P."
(See page 423.)

NOIL—See Taylor Mfg. Co.

O. B.—See Universal Mfg. Co.

P. T. C.—See Pacific Tucking & Mfg. Co.

PACIFIC Tucking & Mfg. Co., 471-73 18th St., Brooklyn, N. Y. "P.T.C."

PEERLESS Accessories Manufacturers, 1926 S. Wabash Ave., Chicago, Ill.

PURAIR—See Hert Mfg. Co.

RACINE Engine & Machinery Co., Racine, Wis. "Two Minute."

ROHRBACHER Automatic Air Pump Co., 173 E. Water St., Portland, Ore.

SMITH, Irwin C., 925 Santee St., Los Angeles, Cal.

SMITH Motor Devices Co., Dolgeville, N. Y.

SPENCER—See General Tool Co.

STEWART-WARNER Speedometer Corp., 1904 Diversey Blvd., Chicago, Ill.
(See page 555.)

TANDEM—See Herz & Co.

TAYLOR Mfg. Co., P. O. Box 485 B. A., Chicago, Ill. "Noil."
(See page 535.)

TEN-EYCK—See Auto Air-Rotor Co.

TRI-PHOON—See Green & Swett Co.

TROY Auto Specialty Co., Troy, N. Y. "Hanna."

TWO MINUTE—See Racine Engine & Machinery Co.

UNION Auto Specialties Co., Brookville, Pa.

Complete Index to Classification appears on Pages 8 to 26.

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There Is No Other Quality Pump On the Market With the Selling Value of the

MANZEL
ENGINE DRIVEN TIRE PUMP

If you will look over the field you will find that practically all of the exploitation in the tire pump field is confined to spark plug pumps and inferior tire pumps made to sell at a price.

Realizing the absolute necessity of supplying the automobile industry with a high-grade, high quality, multi-cylinder tire pump, we have increased our output to such an extent that we are now selling the Manzel two-cylinder, engine-driven tire pump, as you know, at a retail price of $20.

Coincidentally with the increasing of our manufacturing facilities and consequent reduction in price, we at the same time vastly increased our advertising appropriation. We are showing the public conclusively that while they by all means should buy a quality product, such as the Manzel two-cylinder, engine-driven pump, that by spending $20 they are paying enough to get the finest pump that can be manufactured.

We will be glad to quote you dealers' terms if you will get in touch with us immediately.

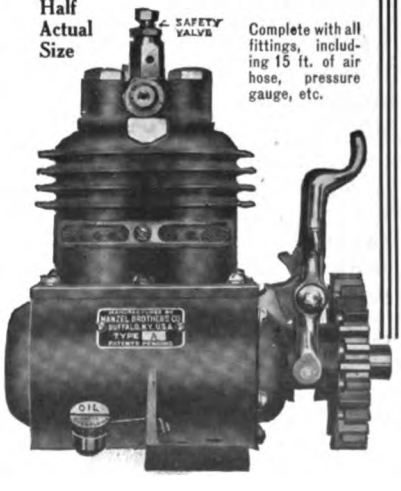
We carry in stock Fittings for the following cars:

Abbott-Detroit, Buick, Cadillac, Cartercar, Case, Chandler Six, Chalmers, Cole, E. M. F., Franklin, Hudson, Imperial Six, KisselKar, Maxwell, Michigan, Mitchell, Oakland, Oldsmobile, Overland, Packard, Paige - Detroit, Rambler Cross Country, Reo, Simplex, Speedwell, Studebaker, Stutz, Velie, and others.

Weight, 7 Pounds

Retail Price, $20

Half Actual Size



Complete with all fittings, including 15 ft. of air hose, pressure gauge, etc.

Manzel Brothers Company
Factory and General Sales Offices
320 Babcock Street, Buffalo, New York
Leaders for 16 years, in the manufacture of quality oil pumps for heavy duty steam and gas engines

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PUMPS (Continued)

ENGINE DRIVEN TIRE PUMPS (Continued)

UNIVERSAL Air Equipment Co., 49 S. Delaware St., Indianapolis, Ind.

UNIVERSAL Mfg. Co., 308-12 Ninth St., S., Minneapolis, Minn. "O. B."

UTILITY—See Hill Pump Valve Co.

WHEATON & Co., C. M. Sunbury, Ohio. "E-Z."

HAND TIRE PUMPS

AEOLUS—See Bridgeport Brass Co.

AERTITE—See Keystone Novelty Co.

AMERICAN Carboneter Co., 1514 Michigan Ave., Chicago, Ill. "Follkie."

ANTHONY Co., 138 West Ave., Long Island City, N. Y.

APEX—See Buffalo Auto Accessory Mfg. Co.

APEX Electric Mfg. Co., 1410 W. 59th St., Chicago, Ill. "Yankee."

ATLAS—See Bridgeport Brass Co.

BELL Pump Co., Detroit, Mich. (See page 633.)

BINKS—See Star Brass Works.

BISHOP-BABCOCK-BECKER Co., Cleveland, O.

BLIZZARD—See Bridgeport Brass Co.

BOSS—See Cox Brass Mfg. Co.

BRIDGEPORT Brass Co., P. O. Station L., Bridgeport, Conn. "Stapley," "Æolus," "Atlas," "Windjammer," "Crown." (See page 323.)

BROWN Co., 213 Bellevue Ave., Syracuse, N. Y.

BUFFALO Auto Accessory Mfg. Co., 369 Ellicott St., Buffalo, N. Y. "Apex," "Zenith," "Magic." (See page 515.)

CARVER—See Osborne & Stephenson Mfg. Co.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O. "Springfield."

CLEVELAND Faucet Co., 708 Frankfort Ave., N. W., Cleveland, O.

CODMAN & Shurtleff, 120 Boylston St., Boston, Mass.

COE-STAPLEY Mfg. Co., 1565 Railroad Ave., Bridgeport, Conn. "Rex," "Little Giant."

COLUMBIA—See Judd & Leland Mfg. Co.

COX Brass Mfg. Co., Albany, N. Y. "Boss," "Handy," "Reliable." (See page 357.)

CROWN—See Bridgeport Brass Co.

CYCLONE—See Judd & Leland Mfg. Co.

EUREKA—See Judd & Leland Mfg. Co.

FOLLKIE—See American Carboneter Co.

GATLING—See Lake Erie Mfg. Co.

GLEASON-PETERS Air Pump Co., 255-61 Classon Ave., Brooklyn, N. Y.

GOULDS Mfg. Co., Seneca Falls, N. Y.

HANCOCK Mfg. Co., 770 Henry St., Charlotte, Mich.

HANDY—See Cox Brass Mfg. Co.

HAWTHORNE Mfg. Co., 38 Spruce St., Bridgeport, Conn.

HERCULES—See Sunderland Mfg. Co.

HILL—See Judd & Leland Mfg. Co.

HILL Pump Valve Co., 18-20 E. Kinzie St., Chicago, Ill. "Utility."

HOWELL Co., W. H., Geneva, Ill. "Jensen."

IDEAL—See Noera Mfg Co.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. "Wixon." (See page 83.)

JENSEN—See Howell Co.

JUDD & Leland Mfg. Co., Clifton Springs, N. Y. "Eureka," "Columbia," "Tornado," "Cyclone," "Hill," "Victor." (See pages 205 and 479.)

KELLOGG Mfg. Co., Rochester, N. Y. (See page 325.)

KEYSTONE Novelty Co., Columbia, Pa. "Myers Aertite."

LAKE Erie Mfg. Co., 192-98 Chicago St., Buffalo, N. Y. "Gatling," "Minuteman," "Sentinel." (See page 471.)

LITTLE GIANT—See Coe-Stapley Mfg. Co.

MAGIC—See Buffalo Auto Accessory Mfg. Co.

MARVEL—See St. Charles Specialty Mfg. Co.

MAYO Mfg. Co., 58 E. 18th St., Chicago, Ill. "Skinner." (See page 325.)

MINUTEMAN—See Lake Erie Mfg. Co.

MYERS AERTITE—See Keystone Novelty Co.

NOERA Mfg. Co., Waterbury, Conn. "Red Devil," "Ideal," "Waterbury."

OSBORNE & Stephenson Mfg. Co., W. Main St., Plainville, Conn. "Carver." (See page 471.)

PEERLESS Accessories Manufacturers, 1926 S. Wabash Ave., Chicago, Ill.

PITNER—See Sunderland Mfg. Co.

RED DEVIL—See Noera Mfg. Co.

RELIABLE—See Cox Brass Mfg. Co.

REX—See Coe-Stapley Mfg. Co.

SENTINEL—See Lake Erie Mfg. Co.

SHAWVER Co., rear 31 W. Pleasant St., Springfield, O. "Springfield."

SKINNER—See Mayo Mfg. Co.

SPRINGFIELD—See Central Brass & Fixture Co.

SPRINGFIELD—See Shawver Co.

STAPLEY—See Bridgeport Brass Co.

STAR Brass Works, 1909-11 Fulton St., Chicago, Ill. "Binks."

STEVENS Mfg. & Supply Co., Fischer Bldg., Chicago, Ill.

STOCKER Mfg. Co., 61 Fort St., E., Detroit, Mich.

SUNDERLAND Mfg. Co., 61 E. 24th St., Chicago, Ill. "Hercules," "Thor," "Pitner."

THOR—See Sunderland Mfg. Co.

TORNADO—See Judd & Leland Mfg. Co.

TURNER Brass Works, Sycamore, Ill.

UTILITY—See Hill Pump Valve Co.

VICTOR—See Judd & Leland Mfg. Co.

WATERBURY—See Noera Mfg. Co.

WINDJAMMER—See Bridgeport Brass Co.

WIXON—See Imperial Brass Mfg. Co.

YANKEE—See Apex Electric Mfg. Co.

ZENITH—See Buffalo Auto Accessory Mfg. Co.

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"Bridgeport" BRASS CO. TRADE MARK U.S.A. U.S.A.

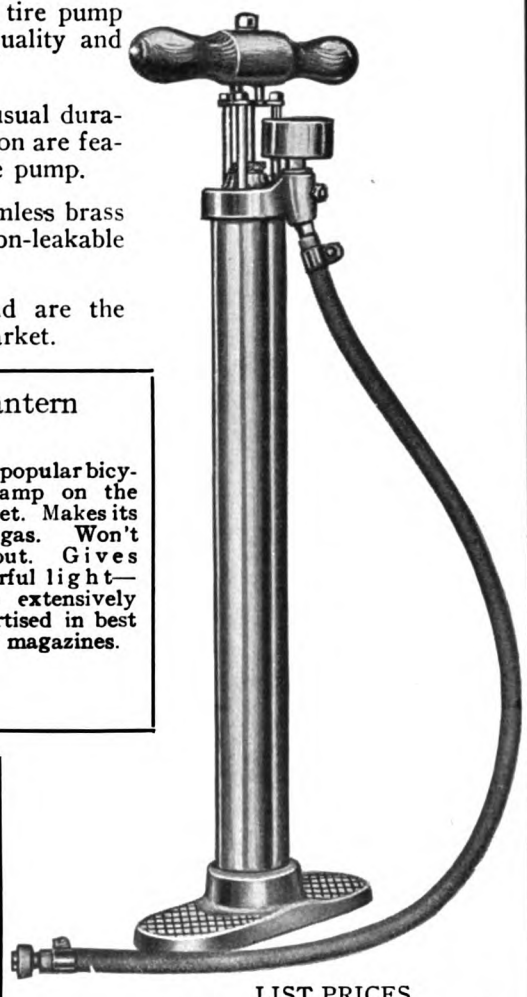
Tire Pumps and "Search-Light" Bicycle Lantern

The name **"Bridgeport"** on a tire pump is a guarantee of the highest quality and finest workmanship.

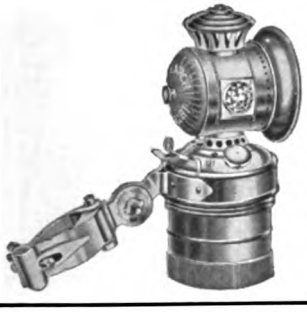
Simplicity of construction, unusual durability and air-tight pump connection are features of every **"Bridgeport"** tire pump.

"Bridgeport" pumps have seamless brass barrels and cannot rust. Have non-leakable valves and heavy cast base.

They are well advertised and are the most popular pumps on the market.



"Search-Light" Gas Lantern



most popular bicycle lamp on the market. Makes its own gas. Won't jar out. Gives powerful light—also extensively advertised in best boys' magazines.

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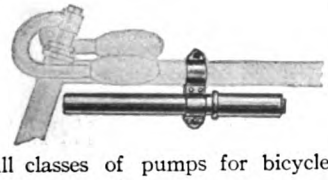

All classes of pumps for bicycles and motorcycles.

Write for list.

LIST PRICES
Without Gauge.....$4.00
With Gauge..... 6.00

BRIDGEPORT BRASS COMPANY
BRIDGEPORT, P. O. Station L. CONNECTICUT

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PUMPS (Continued)

OIL PUMPS

(See Lubricators)

STEAM AIR PUMPS

AMERICAN Steam Pump Co., Battle Creek, Mich. "Marsh."

MARSH—See American Steam Pump Co.

UNION Steam Pump Co., Battle Creek, Mich.

STEAM BOILER FEED PUMPS

AMERICAN Steam Pump Co., Battle Creek, Mich. "Marsh."

MARSH—See American Steam Pump Co.

OFELDT & Sons, August. Valley Stream, N. Y.

UNION Steam Pump Co., Battle Creek, Mich.

WATER CIRCULATING PUMPS

ATLAS Brass Foundry Co., 980-90 S. Front St., Columbus, O.

BLACKMER Rotary Pump, Power & Mfg. Co., Petoskey, Mich.

DOEHLER Die-Casting Co., Court & Ninth Sts., Brooklyn, N. Y. (See page 111.)

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. (See page 83.)

KINNEY Mfg. Co., 100 Boylston St., Boston, Mass.

LEE Co., Wm. O., Port Huron, Mich. (See page 113.)

LIPMAN Mfg. Co., 211 Pleasant St., Beloit, Wis.

LOBEE Pump & Machinery Co., 111-19 Dearborn St., Buffalo, N. Y.

OBERDORFER Brass Co., M. L., 304 E. Water St., Syracuse, N. Y.

OTTUMWA-MOLINE Engine & Pump Co., Ottumwa, Ia.

SPARKS-WITHINGTON Co., Jackson, Mich.

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

PURIFIERS

ACETYLENE GAS PURIFIERS

EDMUNDS & Jones Mfg. Co., 432-52 Lawton Ave., Detroit, Mich. (See page 233.)

TINKMAN Mfg. Co., Pierce City, Mo.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. (See page 293.)

PUSHES

FOOT PUSHES

(For ringing electric bells)

EDWARDS & Co., 140th & Exterior Sts., New York, N. Y.

ROUSSEAU, David, Ossining, N. Y.

PUTTY

ACME White Lead & Color Works, 1740-1800 St. Aubin Ave., Detroit, Mich.

ALLENTOWN Mfg. Co., 26 S. Sixth St., Allentown, Pa.

BAKER, Wm. T., 220-32 Suydam Ave., Jersey City, N. J. "Reliable."

BELKNAP, McSherry & Moran Co., E. S., 5 Ainslie St., Brooklyn, N. Y.

BRIGGS & Co., John, 45 Purchase St., Boston, Mass.

CHICAGO White Lead & Oil Co., 1454 S. Western Ave., Chicago, Ill.

DEVOE & C. T. Raynolds Co., F. W., 101 Fulton St., New York, N. Y.

DICKS-PONTIUS Co., 28 N. Canal St., Dayton, O.

FELTON, Sibley & Co., 136-40 N. Fourth St., Philadelphia, Pa.

FRENCH & Co., Samuel H., York Ave., Fourth & Callowhill Sts., Philadelphia, Pa.

LUCAS & Co., John, 322-30 Race St., Philadelphia, Pa.

RELIABLE—See Baker, Wm. T.

WILHELM Co., A., Third & Bern Sts., Reading, Pa.

RACES

BALL RACES

(See Cups, Ball)

RACKS

HAT RACKS

(See also Hangers, Hat)

BRIDGEPORT Coach Lace Co., 1731-37 Broadway, New York, N. Y. (See page 153.)

COLUMBIA—See Horstmann Co.

HORSTMANN Co., Wm. H., Fifth & Cherry Sts., Philadelphia, Pa. "Columbia."

SCHLEGEL Mfg. Co., College Ave. & N. Goodman St., Rochester, N. Y.

VOGT Mfg. & Coach Lace Co., 408-10 St. Paul St., Rochester, N. Y.

TRUNK RACKS

CONNECTICUT Steel & Wire Co., 57-61 Allyn St., Hartford, Conn. "Standard."

CRANMER, Harry C., 223 S. 24th St., Philadelphia, Pa.

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MAYO SPARK PLUG PUMP

The original Spark Plug Pump. Complete with 12 ft. hose, gauge, all connections, $10.00. MAYO Quick Detachable Spark Plug—$1.25 extra—may be used if desired. Special Ford Pump, $8.00 complete. Valve Cap Pump, permanently attached to motor, $15.00. Liberal dealers' discount. Sold on 30 days' approval. Write for money making sales proposition.

MAYO MFG. CO.

58 E. 18th St. Chicago, Ill.

DEWEY POWER TIRE PUMP

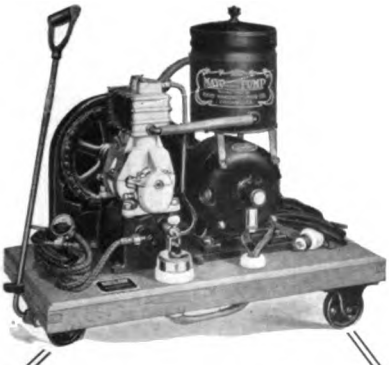
$8 COMPLETE NO EXTRAS

Easiest to sell because there is nothing so complete at anything near its price.
It is made of steel thruout, enameled black with a gold transfer. The **Dewey never has to be oiled, pumps chemically pure air,** and is furnished **complete** with 12 feet of special hose, high grade gauge, self-opening connection and adapters for any make car.

Sold under a rigid guaranty.

THE DEWEY-ANDERSON MFG. CO.

456 Woodruff Ave., Toledo, Ohio



MAYO ELECTRIC GARAGE PUMP

Portable outfit for heavy duty use in public or private garages. Two-cylinder pump driven by ¼ H. P. electric motor with silent chain drive. Complete with 10 ft. electric wire and attachment plug, 12 ft. hose, gauge, tire valve connection. Fully guaranteed for one year. Price, complete, $75.00. Write for trade discount.

MAYO MFG. CO.

58 E. 18th St. Chicago, Ill.

Engine Driven KELLOGG Tire Pump

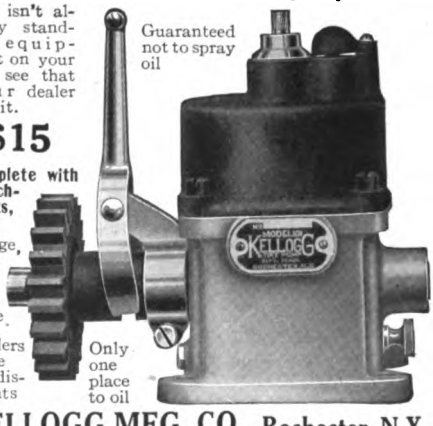
Made with complete attachments ready to install on any car, especially 1914 and 1915 models.
An all metal pump with features of construction that will make it last as long as your car.

If it isn't already standard equipment on your car, see that your dealer gets it.

$15

Complete with attachments, Air Gauge, 15ft Rubber Hose.

Dealers write for discounts



KELLOGG MFG. CO., Rochester, N.Y

Boston New York Chicago Detroit San Francisco

Distributing Stations Everywhere

4 Cyl. Pumps, Garage Pumps, Air Starters, Air Ford Starters

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RACKS (Continued)

TRUNK RACKS (Continued)

HIGHTON & Sons Co., Wm., Nashua, N. H.

MASCO—See Milwaukee Auto Specialty Co.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Masco." (See page 449.)

NOONAN Tool & Machine Works, 130-36 St. James St., Rome, N. Y.

REED Co., 390 Main St., Mayfield, Cal.

REESE Machine & Tool Works, S., 224-30 W. Main St., Plymouth, Pa.

SMITH, H. Lund, 199-203 Paterson St., Paterson, N. J.

STANDARD—See Connecticut Steel & Wire Co.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. (See page 293.)

RADIATORS

WATER COOLERS OR RADIATORS

A-Z Co., 530 W. 56th St., New York, N. Y.

BRISCOE Mfg. Co., Woodward & Baltimore Aves., Detroit, Mich. (See page 331.)

BUSH Mfg. Co., Hartford, Conn. (See page 207.)

CANDLER Radiator Co., Detroit, Mich. (See page 331.)

DETROIT Radiator & Specialty Co., 959 Woodward Ave., Detroit, Mich. (See page 437.)

DIPPERT—See Motor Radiator Co.

EL ARCO Radiator Co., West End Ave. & 64th St., New York, N. Y.

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

EUREKA Auto Parts Mfg. Co., 1915 Pine St., St. Louis, Mo.

FEDDERS Mfg. Co., Buffalo, N. Y. (See pages 328 and 329.)

GABRIELSON Car Parts Mfg. Co., Fenton Bldg., Jamestown, N. Y.

GOETZ Co., 1802 Clybourn Ave., Chicago, Ill.

HARRISON Mfg. Co., Lockport, N. Y. (See page 331.)

HOLIHAN Mfg. Co., 21st & Jefferson Sts., Detroit, Mich.

IDEAL Sheet Metal Works, 2809 Michigan Ave., Chicago, Ill. (See page 331.)

KELLS Mfg. Co., W. J., 521-25 W. 45th St., New York, N. Y. (See page 203.)

KINSEY Mfg. Co., Toledo, O. "Kinwood."

KINWOOD—See Kinsey Mfg. Co.

KURTZNER Radiator Co., 2225 Ashland Rd., Cleveland, O.

LIVINGSTON Radiator & Mfg. Co., 75th St. & Amsterdam Ave., New York, N. Y.

LONG Mfg Co., Detroit, Mich. (See page 327.)

McCORD Mfg. Co., Detroit, Mich. (See pages 178 and 179.)

MAYO Radiator Co., New Haven, Conn.

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

METALLIC Shell & Tube Co., 127-29 Valley St., East Providence, R. I.

MOTOR Radiator Co., Mutual Life Bldg., Buffalo, N. Y. "Dippert."

NATIONAL Can Co., Detroit, Mich. (See page 333.)

NATIONAL Radiator Co., 846 S. Canal St., Chicago, Ill.

PERFEX Radiator Co., Racine, Wis.

ROME-TURNEY Radiator Co., Rome, N. Y.

TAKE-APART-RADIATOR Co., 804 E. Washington St., Greensburg, Ind. "T-A-R-Co."

T-A-R-CO—See Take-Apart-Radiator Co.

TODD Mfg. Co., 820-24 Mary Pl., Minneapolis, Minn.

UNIVERSAL Car Equipment Co., 245 John R St., Detroit, Mich. (See pages 521 and 559.)

WISCONSIN Automobile Radiator Co., North Milwaukee, Wis.

RAILS

ROBE OR COAT RAILS

ALLEN Fire Department Supply Co., Providence, R. I.

AMERICAN Brass Novelty Co., Grand Haven, Mich.

AMESBURY Brass & Foundry Co., Amesbury, Mass

ATTWOOD Brass Works, Scribner Ave. & Bowery St., Grand Rapids, Mich. (See page 249.)

AUTO Specialty Co., 89 Pearl St., Boston, Mass.

B. G. & M. Mfg. Co., 543 N. Franklin St., Chicago, Ill.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O.

COWLES & Co., C., New Haven, Conn. (See page 87.)

COX Brass Mfg. Co., Albany, N. Y. (See page 357.)

DETLAFF, A. J., 121 Champlain St., Detroit, Mich.

DOUGLAS & Lomason Co., Detroit, Mich. (See page 211.)

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

ENTERPRISE Brass & Plating Co., 2838-44 Spring Grove Ave., Cincinnati, O.

F & K—See Findeisen & Kropf Mfg. Co.

FINDEISEN & Kropf Mfg. Co. 2125 Rockwell St., Chicago, Ill. "F & K," "Fit-all." (See page 93.)

FIT-ALL—See Findeisen & Kropf Mfg. Co.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Milwaukee." (See page 83.)

HIGHTON & Sons Co., Wm., Nashua, N. H.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. (See page 83.)

JONAH & George, Merrimac, Mass.

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

KINSEY Mfg. Co., Toledo, O.

Complete Index to Classification appears on Pages 8 to 26.

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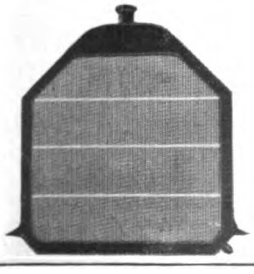
Properly Cooled Motors Are Most Efficient



THE STANDARD OF THE WORLD

LONG

Cooling Systems

Long Cooling Systems are today a part of the *regular* equipment of more than seventy makes of motor cars, trucks and tractors. They are correct in design, workmanship and material. The radiating qualities of Long Cooling Systems make them the *logical* selection where high class motors are used.

Guaranteed to Be Perfectly Free from Imperfection in Design, Material and Workmanship

Extra quality of material—extra care in making—extra precautions in testing, *assure* extra efficiency. Sufficient radiation to keep motor cool at all times. Absolute assurance against the annoyance and loss occasioned so often by "under" or "over" radiation due to poorly designed "radiators."

Guaranteed to Properly Cool the Motors for Which They Are Built

Each Long Cooling System for each style of motor is an individual problem with us—*a problem that we solve.* Each system is designed to *fill* the individual requirements. Each radiator is thoroughly tested and inspected, washed with live steam and every precaution taken to stand the test of actual service.

Several types of Long Cooling Systems are made—Cellular, Flat Tube Honeycomb, Spiral Tube, Fin and Tube. Write for catalog. Or—if you wish, we will gladly send our Radiation Engineering Experts to confer with you relative to *your* radiation problem.

We are specialists in the designing and manufacturing of cooling systems

LONG MFG. CO., Detroit, Mich.

Pioneer Makers of Gasoline Engine Cooling Systems

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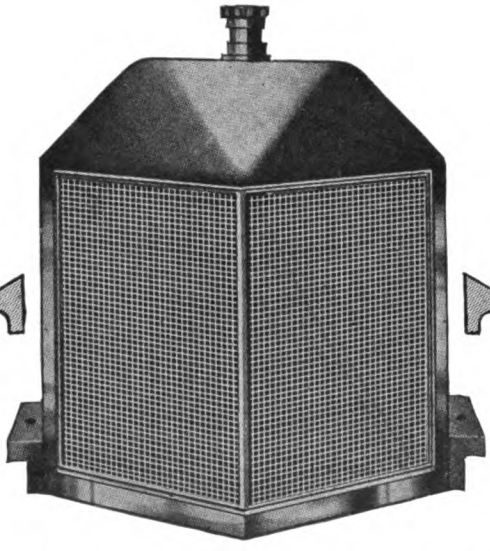
QUALITY



Style and efficiency can be given Ford Cars if you replace the old style with a Fedders V Type Radiator.

FED
RAD

Ford owners in all parts of the country are equipping their cars with Fedders V Type Radiators.

This radiator goes further than improve the appearance of Ford cars—it improves the engine efficiency to a degree that is highly satisfactory.

The price, $42.00, and the ease with which the Fedders V Type Radiator can be put on makes an altogether agreeable proposition for every Ford owner.

Dealers—Write for particulars regarding discounts and get our installation instructions.

The New Fedders V Type Radiator for Ford Cars is made of the same materials, and with the same skill that is employed in the making of regular Fedders Quality Radiators.

Fedders Manufacturing Co., Inc.

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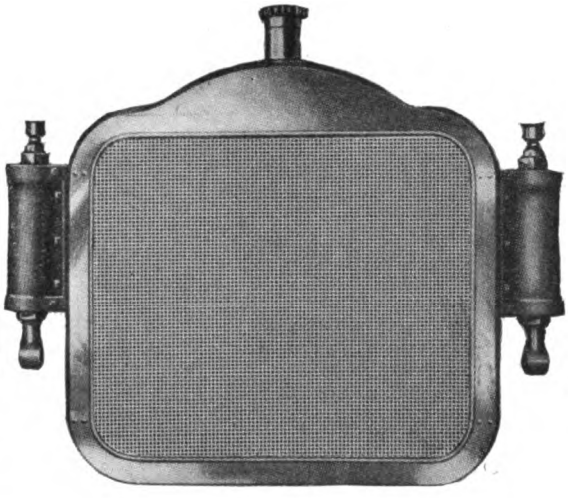
RADIATORS

Fedders Quality and Strength are worthy of your consideration if better service means anything to your car.



DERS
TORS

In almost any other part of an automobile Quality could be sacrificed with less injury to the service of the car.

Fedders Radiators have enjoyed the uninterrupted patronage of many of the more prominent automobile manufacturers for years because very early in the history of the automobile industry the quality of their service won them an enviable reputation, a reputation for efficient performance which they never have relinquished or compromised.

Wherever Fedders Standard Design will serve we recommend its adoption, but in cases where some special design is required, our facilities enable us to handle such orders economically and promptly.

Booklet on request.

Buffalo - - - New York

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RAILS (Continued)

ROBE OR COAT RAILS (Continued)

LAMB Mfg. Co., Winsted, Conn.

MEDINA Stamping & Machine Co., Medina, N. Y.

METAL Stamping Co., 13th St., & Boulevard, Long Island City, N. Y.

MILWAUKEE—See Garage Equipment Mfg. Co.

MURDOCK, Jr. Co., Jas., 116 Opera Pl., Cincinnati, O.

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y.
(See page 87.)

REGAN & Kirwin Mfg. Co., 37 Shattuck St., Lowell, Mass.

SMITH & Co., Jos. N., Detroit, Mich.
(See page 547.)

SMITH, H. Lund, 199-203 Paterson St., Paterson, N. J.

STAR Brass Works, 1721-23 Baltimore Ave., Kansas City, Mo.

STERLING—See Auto Accessories Mfg. Co.

TURNER Brass Works, Sycamore, Ill.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

WHITE Mfg. Co., 155 Cannon St., Bridgeport, Conn.

WHITEHOUSE LeCompte Mfg. Co., 42-54 Elm St,. Newark, N. J.
(See page 235.)

WIENER-BARNET Co., 312-28 Adams St., Newark, N. J.
(See page 249.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

RECORDERS

VEHICLE MOVEMENT RECORDERS

(For recording time vehicle is used)

AMERICAN Taximeter Co., 735-37 Seventh Ave., New York, N. Y. "Recordograf."

BROWN, W. H., Rose Bldg., Cleveland, O. "Traflog."

CORONET Mfg. Co., 10308 Euclid Ave., Cleveland, O.

JONES Speedometer Co., Bush Terminal, Brooklyn, N. Y.

KNOPF Bros. Mfg. Co., 2071 Seventh Ave., New York, N. Y.

RECORDING Speedometer Co., Academy St., Newark, N. J. "Speedograph."

RECORDOGRAF—See American Taximeter Co.

SEARS-CROSS Co., 19-21 W. 62d St., New York, N. Y.
(See page 431.)

SERVICE Recorder Co., 2344 E. 105th St., Cleveland, O. "Servis."

SERVIS—See Service Recorder Co.

SPEEDOGRAPH—See Recording Speedometer Co.

TRAFILOG—See Brown, W. H.

UNIQUE Recorder Co., Glover Bldg., Hazleton, Pa.

RECTIFIERS

ALTERNATING CURRENT RECTIFIERS

AMERICAN Battery Co., 1132-34 Fulton St., Chicago, Ill.

ASHBROOK, J. F., 2639 Emmet St., Chicago, Ill. "Johns."

ECONOMY—See Electric Economy Co.

EDISON, Thomas A., 114 Lakeside Ave., Orange, N. J.

ELECTRIC Economy Co., Hyde Park, Mass. "Economy."

ELECTRIC Products Co., Cleveland, O. "Wotton."

ELECTRIC Storage Battery & Mfg. Co., Cincinnati, O.

ELLINGTON Electric Co., Quincy, Ill.

GENERAL Electric Co., Schenectady, N. Y.

HICKLEY, Thomas, Belmar, N. J.

JOHNS—See Ashbrook, J. F.

MOHAWK Electric Mfg. Co., 45 Lawrence St., Newark, N. J.

MURPHY Electricity Rectifier Co., 187 N. Water St., Rochester, N. Y.

ST. LOUIS Electrical Works, 5410 Easton Ave., St. Louis, Mo.

SERVICE Battery Co., 2325-27 Wabash Ave., Chicago, Ill.

SIMPLICITY—See Wilson Supply Co.

SIRCH Electrical & Testing Laboratories, 126 W. Third St., Los Angeles, Cal.

STANDARD Metal Mfg. Co., Newark, N. J.
(See page 219.)

WAGNER Electric Mfg. Co., 6400 Plymouth Ave., St. Louis, Mo.

WESTINGHOUSE Electric & Mfg. Co., (E. Pittsburg), Pittsburg, Pa.

WILSON Supply Co., 1191 Gladys Ave., Cleveland O. "Simplicity."

WOTTON—See Electric Products Co.

REEDS

HORN REEDS

AUTOMOBILE Supply Mfg. Co., 220 Taaffe Pl., Brooklyn, N. Y.

NONPAREIL Horn Mfg. Co., 73-75 Wooster St., New York, N. Y.

RILEY-KLOTZ Mfg. Co., 17 Mulberry St., Newark, N. J.

STANDARD Metal Mfg. Co., Newark, N. J.
(See page 219.)

Complete Index to Classification appears on Pages 8 to 26.

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JUST OUT!

Ready for Market

IDEAL

Has Just Completed the 1915 Limited, Staggered Honey-Comb "V" Type Ford Radiator.

Dealers' Price

Prepaid and Delivered to Your City **$25.00** Everywhere in the United States

To avoid delays send remittance with order. Demand **Ideal Radiators,** flat front or "V" Type for all makes of cars. Radiator repairs properly attended to. Out of town customers receive special attention.

IDEAL SHEET METAL WORKS

2809 MICHIGAN AVE. CHICAGO

Harrison Mfg. Co., Inc.

Lockport, N. Y.

Manufacturers of the

"Hexagon Cellular" Radiators

Lightest and Most Efficient

Briscoe Manufacturing Company

Main Office and Factory: Detroit, Mich.

MANUFACTURERS OF

Briscoe Automobile Radiators

Hoods, Fenders, Tanks, Sheet Metal Parts and Metal Stampings

Main Office, Cor. Woodward and Baltimore Aves.

DETROIT, MICHIGAN

Candler Cellular Radiators

STRONG—LIGHT IN WEIGHT—EFFICIENT

We are building a High Quality Cellular Radiator possessing the above features. Being of unique design and construction we are able to offer a Cellular Radiator at a very interesting price. We solicit your inquiries.

CANDLER RADIATOR COMPANY

DETROIT, MICH.

HANDSOME IN APPEARANCE

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REFLECTORS

MIRROR LAMP REFLECTORS

BACHE & Co., Semon, West & Hubert Sts., New York, N. Y.

BAUSCH & Lomb Optical Co., Rochester, N. Y.

FRY Glass Co., H. C., Rochester, Pa.

JEFFERSON Glass Co., Follansbee, W. Va.

LANCASTER Lens Co., Lancaster, O.

MACBETH-EVANS Glass Co., Wabash Terminal Bldg., Pittsburg, Pa.

MATISSE, C. & A., 543-49 E. 116th St., New York, N. Y.

NATIONAL Reflector Co., Clarksburg, W. Va.

REGULATORS

ACETYLENE PRESSURE OR REDUCING VALVE REGULATORS

(For use with acetylene lamps or starters: See also Controllers, Acetylene Lamps)

AUTO Lamp & Metal Works, 1906 Broadway, New York, N. Y. "L. & H."

CRUM-WILEY Mfg. Co., Peru, Ind.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

JERICHO—See Randall-Faichney Co.

L. & H.—See Auto Lamp & Metal Works.

PREST-O-LITE Co., 1400 Speedway, Indianapolis, Ind.
(See page 515.)

RANDALL-FAICHNEY Co., Boston, Mass. "Jericho."

FUEL FEED REGULATORS

OFELDT & Sons, F. W., Nyack, N. Y.

TANK PRESSURE REGULATORS

(For regulating the exhaust pressure on gasoline or oil tanks)

BUCKEYE—See Central Brass & Fixture Co.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O. "Buckeye."

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

LOCKE Regular Co., 76 North St., Salem, Mass.

LUNKENHEIMER Co., 228 E. Eighth Ave., Cincinnati, O.

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

WATER LEVEL REGULATORS

OFELDT & Sons, F. W., Nyack, N. Y.

WINDOW REGULATORS

COWLES & Co., C., New Haven, Conn. "Fisher."
(See page 87.)

FISHER—See Cowles & Co.

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y.
(See page 87.)

PERFECT Window Regulator Co., 43 Exchange Pl., New York, N. Y.

REMOVERS

CARBON REMOVERS

(See also Compounds, Carbon Removing; also Scrapers Carbon; also Machines, Motor Decarbonizing)

MASCO—See Milwaukee Auto Specialty Co.

MICHENER, E. S., 30 Washington St., New Castle, Pa.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Masco."
(See page 449.)

PAINT AND VARNISH REMOVERS

ACME White Lead & Color Works, 1740-1800 St. Aubin Ave., Detroit, Mich.

AD-EL-ITE—See Adams & Elting Co.

ADAMS & Elting Co., 718-26 Washington Blvd., Chicago, Ill. "Ad-el-ite."

ALBANY Chemical Co., 22 Bradway, Albany, N. Y.

BERRY Bros., Detroit, Mich.

BILCHACO—See Billings-Chapin Co.

BILLINGS-CHAPIN Co., Cleveland, O. "Bilchaco."

BLUE Ribbon Mfg. Co., 27 Baldwin St. (Charlestown), Boston Mass. "Premium."

BRADLEY & Vrooman Co., Chicago, Ill. "Crown."

BRIDGEPORT Wood Finishing Co., New Milford, Conn.

CALLERY & Co., W. W., 188 36th St., Pittsburg, Pa.

CHALMERS Chemical Co., 218 McWhorter St., Newark, N. J. "Phenoid."

CROWN—See Bradley & Vrooman Co.

DETROIT White Lead Works, 530-60 Milwaukee Ave., E., Detroit, Mich. "Rogers Abluent."

EBERSON Paint Co., 18th & Pine Sts., St. Louis, Mo. "V. & P."

ECLIPSE—See Gould & Cutler.

ENTERPRISE Paint Mfg. Co., Peoria & Van Buren Sts., Chicago, Ill. "Noxall."

FOREST City Paint & Varnish Co., 3334 Lakeside Ave., Cleveland, O.

GILLESPIE & Son, Chas. H., 19 Dey St., Jersey City, N. J. "Monarch Bull Dog."

GLIDDEN Varnish Co., W. Madison Ave. & L. S. & M. S. Ry., Cleveland, O.

GOULD & Cutler, 45 Sudbury St., Boston, Mass. "Eclipse."

IDOL-YUSSO—See Schlegel Mfg. Co.

JEWEL—See Wadsworth-Howland Co.

KLEAN-ITT—See Lawrence & Co.

KLENSA—See Standard Varnish Works.

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MADE IN DETROIT USA

NATIONAL RADIATORS

MADE IN DETROIT USA

The Improvement in Radiators

Less Weight —Greater Capacity

All National Radiators are tested at not less than fifteen pounds air pressure under water.

Note: We also make a Special

V Shaped Ford Type

The National Can Company
Detroit, Michigan

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REMOVERS (Continued)

PAINT AND VARNISH REMOVERS (Continued)

KUT-KOTE—See Thurston Co.

LAWRENCE & Co., W. W., Pittsburg, Pa. "Klean-itt."

LUCAS & Co., John, 322-30 Race St., Philadelphia, Pa. "Mirac."

MIRAC—See Lucas & Co.

MONARCH Bull Dog—See Gillespie & Son.

NOXALL—See Enterprise Paint Mfg. Co.

PARROTT Varnish Co., 453 N. Washington Ave., Bridgeport, Conn.

PENINSULAR Paint & Varnish Co., Detroit, Mich.

PHENOID—See Chalmers Chemical Co.

PREMIUM—See Blue Ribbon Co.

ROGERS ABLUENT—See Detroit White Lead Works.

SCHLEGEL Mfg. Co., Oscar, 111 E. 12th St., New York, N. Y. "Idol-Yusso."

STANDARD Varnish Works, (Elm Park), Port Richmond, N. Y. "Klensa."

THURSTON, Co., F. W., 1832-34 S. Clark St., Chicago, Ill. "Kut-Kote."

V. & P.—See Eberson Paint Co.

WADSWORTH-HOWLAND Co., 225 Carpenter St., Chicago, Ill. "Jewel."

WILSON Remover Co., 115 Chestnut St., Newark, N. J. "Wonderpaste."

WONDERPASTE—See Wilson Remover Co.

REPAIRERS

SPRING REPAIRERS

(See Clamps, Spring Repair)

RESTS

BOW RESTS

(See also Holders, Top; also Separators, Bow)

AMERICAN Brass Novelty Co., Grand Haven, Mich.

ANCHOR—See North & Judd Mfg. Co.

BARBEE Mfg. Co., 1401-05 W. Ninth St. Cleveland, O.

CAMPBELL—See Perkins Campbell Co.

CRANDAL, Stone & Co., Binghamton, N. Y.
(See page 369.)

DESOCO—See Detroit Socket Co.

DETROIT Socket Co., 814 Jefferson Ave., W., Detroit, Mich. "Desoco."

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

HOOVER Co., W. H., New Berlin, O.

JONAH & George, Merrimac, Mass.

KEELER Brass Co., 261-71 Godfrey Ave. Grand Rapids, Mich.

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

NORTH & Judd Mfg. Co., New Britain, Conn. "Anchor."

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y.
(See page 87.)

PERKINS Campbell Co., 634 Broadway, Cincinnati, O. "Campbell."
(See page 48.)

SCHERER & Co., H., Detroit, Mich.

SMITH & Co., Jos. N., Detroit, Mich.
(See page 547.)

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

WIENER-BARNET Co., 312-28 Adams St., Newark, N. J.
(See page 249.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

FOOT RESTS

(See also Hassocks)

A-Z Co., 530 W. 56th St., New York, N. Y.

AETNA Brass Mfg. Co., 3870-90 Hamilton Ave., Cleveland, O.

ALLEN Fire Department Supply Co., Providence, R. I.

AMESBURY Brass & Foundry Co., Amesbury, Mass.

ATTWOOD Brass Works, Scribner Ave. & Bowery St., Grand Rapids, Mich.
(See page 249.)

AUTO Specialty Co., 89 Pearl St.,Boston, Mass.

B. G. & M. Mfg. Co., 543 N. Franklin St., Chicago, Ill.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O.

COWLES & Co., C., New Haven, Conn.
(See page 87.)

COX Brass Mfg. Co., Albany, N. Y.
(See page 357.)

DETLAFF, A. J., 121 Champlain St., Detroit Mich. "Rest E-Z."

DOUGLAS & Lomason Co., Detroit, Mich.
(See page 211.)

ENTERPRISE Brass & Plating Co., 2838-44 Spring Grove Ave., Cincinnati, O.

F & K—See Findeisen & Kropf Mfg. Co.

FINDEISEN & Kropf Mfg. Co., 2125 Rockwell St., Chicago, Ill. "K & K."
(See page 93.)

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco."
(See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O.
(See page 81.)

HIGHTON & Sons Co., Wm., Nashua, N. H.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

JONAH & George, Merrimac, Mass.

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

KINSEY Mfg. Co., Toledo, O.

MEDINA Stamping & Machine Co., Medina, N. Y.

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THE "STAR" ANTI-FRICTION RADIAL AND THRUST "BALL RETAINERS"

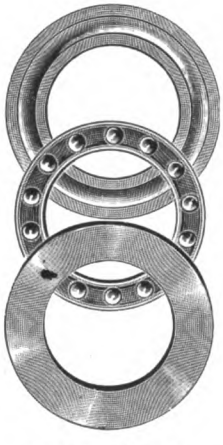
FOR USE IN
HUBS,
STEERING
GEARS,
CLUTCHES,
TRANSMISSIONS,
THRUSTS ON
SHAFTS,
STEERING
KNUCKLES,
FANS,
MAGNETOS,
TIMERS, ETC.

"STAR"

Radial Ball Retainer for Cup and Cone Bearings.

Made in a shop devoted especially to this work by expert workmen and from the best of material.

Our deliveries are prompt. Let us make you quotations and send all details.



"STAR"

Ball Retainer for Thrust Bearings.

THE STAR BALL RETAINER CO.,
LANCASTER, PA.

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RESTS (Continued)

FOOT RESTS (Continued)

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

REGAN & Kirwin Mfg. Co., 37 Shattuck St., Lowell, Mass.

REST E-Z—See Detlaff, A. J.

SARGENT Mfg. Co., New & Summit Sts., Newark, N. J.

SMITH, H. Lund, 199-203 Paterson St., Paterson, N. J.

SMITH & Co., Jos. N., Detroit, Mich. (See page 547.)

STAR Brass Works, 1721-23 Baltimore Ave., Kansas City, Mo.

TURNER Brass Works, Sycamore, Ill.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. (See page 293.)

WHITE Mfg. Co., 155 Cannon St., Bridgeport, Conn.

WHITEHOUSE LECOMPTE Mfg. Co., 42-54 Elm St., Newark, N. J. (See page 235.)

WIENER-BARNET Co., 312-28 Adams St., Newark, N. J. (See page 249.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

HEEL RESTS

AUTO Pedal Pad Co., 794 Seventh Ave., New York, N. Y.

FUQUA Bros., 2418 W. Main St., Richmond, Va.

LUCAS & Son, J. L., 3 Fox St., Bridgeport, Conn.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. (See page 293.)

RETAINERS

BALL RETAINERS

BOSSERT Co., Utica, N. Y. (See page 223.)

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O. (See page 81.)

KONIGSLOW Mfg. Co., Otto, E. 35th St. & Perkins Ave., Cleveland, O.

OAKES Pressed Steel Co., Indianapolis, Ind.

STAR Ball Retainer Co., Lancaster, Pa. (See page 335.)

WORCESTER Pressed Steel Co., Worcester, Mass. (See page 157.)

RHEOSTATS

BATTERY CHARGING RHEOSTATS

ALLEN-BRADLEY Co., 495-97 Clinton St., Milwaukee, Wis.

CUTLER-HAMMER Mfg. Co., Milwaukee, Wis. (See page 191.)

ELECTRIC Products Co., Cleveland, O.

GENERAL Electric Co., Schenectady, N. Y.

LEONARD Electric Co., Ward, Bronxville, N. Y.

WESTINGHOUSE Electric & Mfg. Co., (E. Pittsburg), Pittsburg, Pa.

RIMS

QUICK DETACHABLE RIMS

KELSEY Wheel Co., Detroit, Mich.

MOTT Wheel Works, Utica, N. Y. (See page 453.)

STANDARD Welding Co., Cleveland, O. "Stanweld." (See Book Mark.)

STANWELD—See Standard Welding Co.

WESTON-MOTT Co., Flint, Mich. (See page 411.)

REMOVABLE OR DEMOUNTABLE RIMS

ANGLADA Co., Free Press Bldg., Detroit, Mich.

ASHLEY-MOYER—See General Rim Co.

BAKER—See Universal Rim Co.

CHESTER Demountable Rim Co., Fall River, Mass.

DETROIT—See Jackson Rim Co.

DETROIT Demountable Rim Co., Detroit, Mich. (See page 341.)

E-Z Rim Co., 98 Massachusetts Ave., Boston, Mass.

FIRESTONE Tire & Rubber Co., Akron, O.

FISK Rubber Co., Chicopee Falls, Mass.

FUNK—See Mott Wheel Works.

GENERAL Rim Co., Swetland Bldg., Cleveland, O. "Ashley-Moyer."

HOWARD Demountable Rim Co., 1850 E. State St., Trenton, N. J.

JACKSON Rim Co., Jackson, Mich. "Detroit." (See page 337.)

KELSEY Wheel Co., Detroit, Mich.

MICHELIN Tire Co., Milltown, N. J.

MOTE Demountable & Detachable Rim Co., Wayne County Bank Bldg., Detroit, Mich.

MOTT Wheel Works, Utica, N. Y. "Funk." (See page 453.)

NEWMASTIC Co., 151 W. 68th St., New York, N. Y.

Complete Index to Classification appears on Pages 8 to 26.

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The Rim That is Conclusively Mechanical

THE arrow and "V" block construction makes the Detroit Rim absolutely positive, and is the only demountable rim having this unique feature.

The cut out section of the Detroit Rim allows such freedom of operation in removing the tire that a pair of ordinary hands are the only tools—in extreme cases a small screw driver is the all that is necessary.

We claim for the Detroit rim, strength, lightness, quality, economy and durability, a rim any novice can operate without the assistance of the "nearest garage."

We respectfully request the Builders of Motor Cars to extend the opportunity of proving the worth of the above claims. Our prices are as interesting as our rims.

JACKSON RIM COMPANY

JACKSON, MICHIGAN

Exclusive Manufacturers of the Detroit Demountable Rim

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RIMS (Continued)

REMOVABLE OR DEMOUNTABLE RIMS (Continued)

PRESTO Inter-Rim Co., 883 Boylston St., Boston, Mass. (See page 343.)

SPRANGER Rim & Wheel Co., Ford Bldg., Detroit, Mich.

STANDARD Welding Co., Cleveland, O. "Stanweld." (See Book Mark.)

STANWELD—See Standard Welding Co.

UNIVERSAL Rim Co., 1301 Michigan Ave., Chicago, Ill. "Baker."

WESTON-MOTT Co., Flint, Mich. (See page 411.)

RUBBER STEERING WHEEL RIMS

CONDENSITE Co. of America, Belleville Ave., Glen Ridge, N. J.

DIAMOND RUBBER CO., Akron, O.

GENERAL Insulate Co., 1008-14 Atlantic Ave., Brooklyn, N. Y.

LUZERNE Rubber Co., Trenton, N. J.

STOKES Rubber Co., Jos., Trenton, N. J.

STANDARD RIMS

AMERICAN Tube & Stamping Co., Bridgeport, Conn.

KELSEY Wheel Co., Detroit, Mich.

MOTT Wheel Works, Utica, N. Y. (See page 453.)

STANDARD Welding Co., Cleveland, O. "Stanweld." (See Book Mark.)

STANWELD—See Standard Welding Co.

WESTON-MOTT Co., Flint, Mich. (See page 411.)

WOOD RIMS OR FELLOES

BREECE Mfg. Co., Portsmouth, O.

CAMPBELL & Dann Mfg. Co., Tullahoma, Tenn.

CRANE & MacMahon, 8-10 Bridge St., New York, N. Y. "Nut." "Star."

EBERLY & Orris Mfg. Co., Mechanicsburg, Pa.

HARTWELL & Co., C. L., Chicago Heights, Ill.

JONES & Co., Phineas, Newark, N. J. (See page 477.)

KOLLER & Co., J. B., Mechanicsburg, Pa.

LEBZELTER & Son Co., Philip, 241 N. Queen St., Lancaster, Pa.

NUT—See Crane & MacMahon.

SKINNER Bending Co., J. M., Toledo, O.

STAR—See Crane & MacMahon.

TOLEDO Bending Co., Toledo, O.

TUCKER Woodwork Co., Sidney, O.

YORK Bending Works, 402 N. Queen St., York, Pa.

WOOD STEERING WHEEL RIMS

AMERICAN Wood Rim Co., Onaway, Mich.

AUTO City Bow Co., 441-47 Livernois Ave., Detroit, Mich. (See page 467.)

DETROIT Auto Dash Co., 519-21 Beaubien St., Detroit, Mich. (See page 479.)

TUCKER Woodwork Co., Sidney, O.

RINGS

DUST RINGS

(See Washers, Felt)

PISTON RINGS

AMERICAN Piston Ring Co., 374-78 Jelliff Ave., Newark, N. J.

AUTOMOBILE Accessories Co., 816 W. North Ave., Baltimore, Md. "No-Leak-O."

AUTOMOBILE Construction & Engineering Co., 3224 Ludlow St., Philadelphia, Pa. "Perfection." (See page 341.)

BRIDGEPORT Piston Ring Co., Bridgeport, Conn.

BRYANT Machinery Co., Fort Worth, Tex.

BURD High Compression Ring Co., Rockford, Ill. (See page 339.)

DETROIT Piston Ring Co., 14 Sherman St., Detroit, Mich. "Gaslok."

DUNHAM, M. L., 140 W. 52d St., New York, N. Y. "Duplex."

DUPLEX—See Dunham, M. L.

ECO Mfg. Co., 53 State St., Boston, Mass. (See page 339.)

END-OXY Appliance Co., Trenton, N. J. "Leektite."

EVER Tight Piston Ring Co., 1424-26 Chestnut St., St. Louis, Mo.

FERRO Machine & Foundry Co., 47 Hubbard Ave., Cleveland, O.

GASLOK—See Detroit Piston Ring Co.

HEBERT Mfg. Co., Franklin, N. H.

HORAT, J., Lafayette, Ind. "Tight-Wad."

LAKE Sales Co., 1947 Broadway, New York, N. Y. "Wasson."

LEAK-PROOF—See McQuay-Norris Mfg. Co.

LEEKTITE—See End-Oxy Appliance Co.

McCADDEN Machine Works, St. Cloud, Minn.

McQUAY-NORRIS Mfg. Co., St. Louis, Mo. "Leak-Proof." (See page 339.)

MERRITT Co., S. Whyle, 311 W. 59th St., New York, N. Y.

MICRO Piston Ring Co., 1960 Broadway, New York, N. Y.

NO-LEAK-O—See Automobile Accessories Co.

PEERLESS Piston Ring Co., 95-107 Lafayette St., Newark, N. J.

PERFECTION—See Automobile Construction & Engineering Co.

PERFECTION Piston Ring Co., 149 West St., Gardner, Mass.

PISTON Ring Co., Muskegon, Mich. "Sta-Tite." "Quality."

PRESCOTT Auto Co., Webster, Mass.

QUALITY—See Piston Ring Co.

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Eco Piston Rings

are made from

Special Mixture of Metal

which has been proven to be the ideal material for piston rings.

Trade Mark

We are fitted up to make all standard sizes and makes of rings from individual castings.

QUOTATIONS
given on both large and small lots.
Eco Mfg. Co., 53 State St., Boston

The phosphor bronze coupler that seals the opening

The Piston Ring that challenges and welcomes any comparison or test.

It is guaranteed

BURD High Compression Ring Company

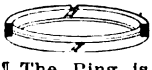
ROCKFORD, ILLINOIS

This is the LEAK-PROOF PISTON RING

Made by McQuay-Norris Mfg. Co.

Here's What It Does

¶ It maintains the full power of the motor by checking the escape of gas during compression and by securing the application of the whole power impulse to the piston head. It reduces carbonization to a minimum because perfect compression is necessary to complete combustion of the fuel charge, and partially burned gas makes carbon deposit. It also prevents surplus oil from working up into the combustion chamber and being burned there, which is another cause of carbon deposit. It saves excessive motor wear by preventing deterioration of lubricating oil that results from condensed gasoline vapor getting down into the crank case.



And How It Does It

¶ The Ring is made of two concentric "L" shaped sections, each of equal strength and closely fitted one around the other. Opposite centres of expansion in each section allow the ring to secure equal tension all round, while the flange of each section seals the expansion opening in the other. This is LEAK-PROOF individuality—the patented feature—and ensures a condition of perfect gas-tightness. It gives the ring unusual strength and does away with the necessity of using any coupling device. Made in all sizes. Easily adjusted.

Over 300,000 motors are now equipped with LEAK-PROOF Rings

Send for Free Booklet

It tells all about piston rings and why you should equip your engine with the LEAK-PROOF. How it will pay you in fuel economy and prolonged motor life. Write for it.

"Ask the User"

PISTON RINGS

Sold by all up-to-date dealers, garages and repair shops

MANUFACTURED BY

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Canadian Factory—W. H. Banfield & Sons
No. 120 Adelaide Street West, Toronto

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RINGS (Continued)

PISTON RINGS (Continued)

SPACKE Machine Co., F. W., Indianapolis, Ind.
(See page 253.)

STA-TITE—See Piston Ring Co.

STA-TITE Packing Ring Co., 3049 Olive St., St. Louis, Mo.

SUPERIOR Auto Parts Co., 938 Ft. Wayne Ave., Indianapolis, Ind.

TEETOR-HARTLEY Motor Co., Hagerstown, Ind.

TIGHT-WAD—See Horat, J.

WAINWRIGHT & Son, W. W., Connersville, Ind.
(See page 309.)

WASSON—See Lake Sales Co.

RIVETS

BRASS AND COPPER RIVETS

BLAKE & Johnson Co., Waterbury, Conn.

BRIDGEPORT Brass Co., P. O. Station L., Bridgeport, Conn. "Crown."
(See page 323.)

COBB & Drew, Plymouth, Mass.

CROWN—See Bridgeport Brass Co.

FALLS Rivet Co., Kent, O.

HASSALL, John, Clay & Oakland Sts., Brooklyn, N. Y.
(See page 291.)

PLUME & Atwood Mfg. Co., 470 Bank St., Waterbury, Conn.

PROGRESSIVE Mfg. Co., Torrington, Conn.

ROME Brass & Copper Co., Rome, N. Y.

STEELE & Johnson Mfg. Co., 779 S. Main St., Waterbury, Conn.

WATERBURY Brass Goods Corp., 160 Washington Ave., Waterbury, Conn.

WATERBURY Mfg. Co., Waterbury, Conn.

COPPER RIVETS

(See Rivets, Brass)

IRON AND STEEL RIVETS

AMERICAN Iron & Steel Mfg. Co., Front & Cumberland Sts., Lebanon, Pa.

AMERICAN Screw Co., Providence, R. I.

ATLAS Bolt & Screw Co., 1289 Marquette Rd., N. E., Cleveland, O.

COBB & Drew, Plymouth, Mass.

COLUMBUS Bolt Works, 162 W. Randolph St., Columbus, O.

FALLS Rivet Co., Kent, O.

GARLAND Nut & Rivet Co., Bailey-Farrell Bldg., Pittsburg, Pa.

GRAND Crossing Tack Co. (Grand Crossing), Chicago, Ill.

HASSALL, John, Clay & Oakland Sts., Brooklyn, N. Y.
(See page 291.)

KANSAS City Bolt & Nut Co. (Sheffield Station), Kansas City, Mo.

LAMSON & Sessions Co., 2188 Scranton Rd., Cleveland, O.

MICHIGAN Bolt & Nut Works, ft. Meldrum Ave., Detroit, Mich.

NATIONAL Screw & Tack Co., Cleveland, O.
(See page 77.)

NEWARK Rivet Works, 262 Lafayette St., Newark, N. J.

PITTSBURG Screw & Bolt Co., Preble Ave. (N. S.), Pittsburg, Pa.

PLYMOUTH Mills, Plymouth, Mass.

READING Screw Co., Norristown, Pa.

REED & Prince Mfg. Co., Duncan Ave., Worcester, Mass.

UPSON Nut Co., Unionville, Conn.

PLATINUM RIVETS

(See Platinum)

ROBES

AUTOMOBILE LAP ROBES

ADIRONDACK—See Spear-Martin Fur Co.

AMERICAN Buffalo Robe Co., 1-7 Howell St., Buffalo, N. Y.

AUTO-COMFORT Robe Co., Gloversville, N. Y.

AUTO Robe & Rubber Co., 13 E. 16th St., New York, N. Y.

AYRES & Sons, Wm., Cumberland & Third Sts., Philadelphia, Pa.

B. E. Mfg. Co., 444 Broadway, New York, N. Y.
(See page 97.)

BALLARD & Co., J. O., Malone, N. Y.

BECKMAN Co., 3167 Fulton Rd., Cleveland, O.

BISHOP Co., J. H., Wyandotte, Mich.

BURLINGTON Blanket Co., Burlington, Wis. "Sho-Fur."

CHASE & Co., L. C., Boston, Mass.
(See page 317.)

CHICAGO Auto Robe Supply Co., 12-16 S. Market St., Chicago, Ill. "Perfection."

CROSBY-FRISIAN Fur Co., 571 Lyell Ave., Rochester, N. Y.

CURTIS & Von Bernuth Mfg. Co., 88 W. Broadway, New York, N. Y.

DAVIS Robe & Armor Co., 3 N. State St., Chicago, Ill.

DAWSON, J. & E., Fairhill Station, Philadelphia, Pa. "Name-On."

DRAPER Bros. Co., Canton, Mass.

GAUSLER & Starr Co., 249 Market St., Philadelphia, Pa.

GORDON Co., J. P., 272 N. Fourth St., Columbus, O.

HODGMAN Rubber Co., 806 Broadway, New York, N. Y.
(See page 351.)

KOPF-ENGEL Co., 49 Warren St., New York, N. Y.

MOORE-SMITH Co., Winthrop Sq., Boston, Mass.

NAME-ON—See Dawson, J. & E.

NEW YORK Lap Robe Co., 28-32 W. Third St., New York, N. Y.

Complete Index to Classification appears on Pages 8 to 26.

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"Detroit"
Demountable Rims

"Detroit"
Tire Carrier

"Detroit"
Top Holders

Let us quote you

Detroit
Demountable Rim Co.
Detroit

RACINE BODIES

Designed and Built

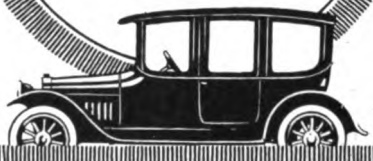
In one of the largest and most up-to-date plants in this manufacturing center. Floor space covers 400,000 square feet.

Separate buildings for manufacturing closed bodies.

Large contracts solicited.

Our designs will please you.

RACINE MFG. CO.
Racine, Wis.



The Most Perfect Piston Rings Made

First Operation

PERFECTION PISTON RINGS

They are made of soft, elastic steel 1/16" wide and put together in sets of four. They give compression and power to your motor unequalled by any other rings. They present a barrier to the gas in the combustion chamber such as cannot be possible with a one piece ring.

This construction gives perfect compression, maximum power, minimum carbon, smaller oil consumption, lower gasoline bills, less smoke and saving in repair bills. These rings are put on the pistons without being stretched, and this is impossible with one piece rings, which are always distorted when stretched over the pistons.

Last Operation

PERFECTION PISTON RINGS are made in all sizes and can be sold by dealers to great advantage. *Let us give you special quotations for your next year's requirements.*

AUTOMOBILE CONSTRUCTION & ENG. COMPANY
3224 Ludlow Street **Philadelphia, Pa.**

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ROBES (Continued)

AUTOMOBILE LAP ROBES (Continued)

NEW York Leather Coat Co., 33-35 Greene St., New York, N. Y.

PERFECTION—See Chicago Auto Robe Supply Co.

REVILLON Frères, 19 W. 34th St., New York, N. Y.

RILEY & Co., Wm. B., 233 Chestnut St., Philadelphia, Pa.

SHO-FUR—See Burlington Blanket Co.

SPEAR-MARTIN Fur Co., 41 Church St., Burlington, Vt. "Adirondack."

WALLACE Co., Hugh, 2626 E. Grand Boulevard, Detroit, Mich.

WESTERN Robe Mills, 43-45 Peck Ct., Chicago, Ill.

WINSHIP, W. W., 71 Summer St., Boston, Mass.

RODS

ADJUSTABLE VALVE LIFT RODS

APCO—See Auto Parts Co.

AUTO Parts Co., 702 Eddy St., Providence, R. I. "Apco."

BRIDGEPORT—See Lyford Bros.

LYFORD Bros., 625 Washington Ave., Bridgeport, Conn. "Bridgeport."

ALUMINUM RODS

(See Aluminum, Sheet)

BRAKE RODS

CINCINNATI Ball Crank Co., Cincinnati, O. (See page 137.)

JACOBS Co., F. L., 451 Guoin St., Detroit, Mich.

MICHIGAN Electric Welding Co., 514 Hart Ave., Detroit, Mich. (See page 596.)

SCHWEPPE & Wilt Mfg. Co., Champlain St. & Meldrum Ave., Detroit, Mich.

STANDARD Welding Co., Cleveland, O. (See Book Mark.)

BRASS RODS

(See Brass, Sheet)

CONNECTING RODS

(Finished or Machined Rods. For connecting rods in the rough—See Forgings, Drop)

BILLINGS & Spencer Co., Hartford, Conn.

GILL & Sons Forge & Machine Works, P. H., Lorraine & Otsego Sts., Brooklyn, N. Y. (See page 175.)

LAYMAN Connecting Rod Co., 1790 Broadway, New York, N. Y.

MICHIGAN Crank Shaft Co., Lansing, Mich. (See page 151.)

SHARP Engineering & Mfg Co., Detroit, Mich. (See page 309.)

STANDARD Gauge Steel Co., Beaver Falls, Pa.

TINDEL-MORRIS Co., Eddystone, Pa.

TUBULAR Connecting Rod Co., 1790 Broadway, New York, N. Y.

COPPER RODS

(See Brass, Sheet)

FIBRE RODS

(See Fibre, Hard)

RUBBER RODS

(See Rubber, Hard)

STEEL RODS

(See Steel)

ROLLERS

CURTAIN ROLLERS

CAREY & Co., 246-48 N. Fifth St., Philadelphia, Pa. "Edw. Reukauf."

COWLES & Co., C., New Haven, Conn. (See page 87.)

EDW. REUKAUF—See Carey & Co.

WHITE Mfg. Co., 155 Cannon St., Bridgeport, Conn.

ROPE

BRONZE WIRE ROPE OR CABLE

ELEPHANT—See Phosphor Bronze Smelting Co.

OMEGA—See Riverside Metal Co.

PHOSPHOR Bronze Smelting Co., 2200 Washington Ave., Philadelphia, Pa. "Elephant." (See page 491.)

REEVES & Co., Paul S., 1415-25 Catherine St., Philadelphia, Pa.

RIVERSIDE Metal Co., Riverside, N. J. "Omega."

STEEL WIRE ROPE OR CABLE

AMERICAN Steel & Wire Co., 208 S. La Salle St., Chicago, Ill. (See page 457.)

BRODERICK & Bascom Rope Co., 817 N. Second St., St. Louis, Mo.

HAZARD Mfg. Co., 81 E. Ross St., Wilkes-Barre, Pa.

LESCHEN & Sons Rope Co., A., 920 N. First St., St. Louis, Mo.

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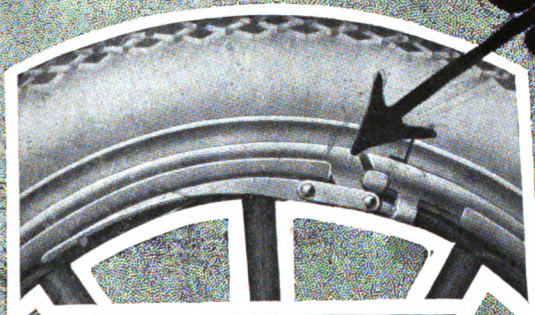
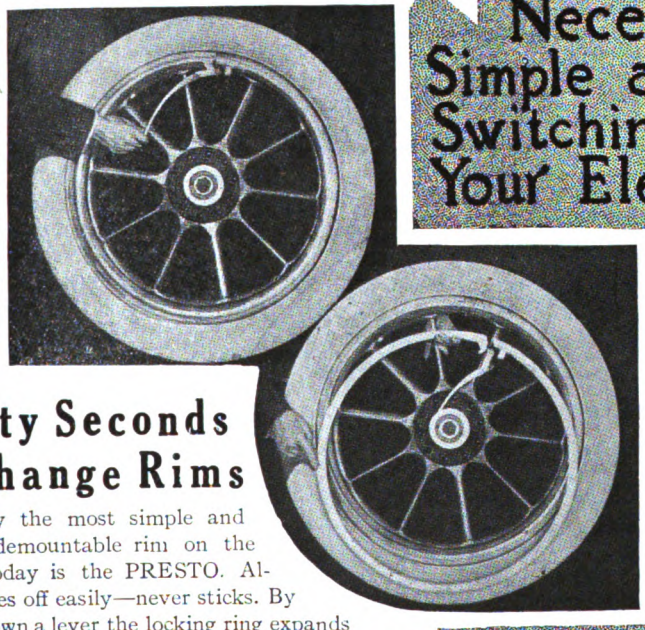
PRESTO DEMOUNTABLE RIMS

Pull Down *this* Lever *and the* Rim Comes Off!



Not a Bolt, Nut, Hammer or Wrench Necessary. Simple as Switching on Your Electric Lights



A Special Rim for Ford Cars at a Special Price

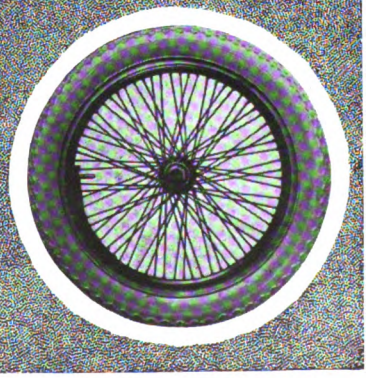
Thirty Seconds To Change Rims

Absolutely the most simple and efficient demountable rim on the market today is the PRESTO. Always comes off easily—never sticks. By pulling down a lever the locking ring expands and forces off the rim. Prevents tire wobbling; has no loose parts. They have both Q. D. and demountable features.

The Only Demountable Rim for Wire Wheels

DEALERS—WRITE TODAY FOR OUR PROPOSITION ON THESE RIMS.

MANUFACTURERS—SEND FOR PRICES ON QUANTITY LOTS.



PRESTO INTER-RIM CO.

883 Boylston Street, BOSTON, MASS.

Western Sales Agents:
AMERICAN DISTRIBUTING CO., JACKSON, MICH.

84-o

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ROPE (Continued)

STEEL WIRE ROPE OR CABLE (Continued)

MACOMBER & Whyte Rope Co., 507-09 S. Clinton St., Chicago, Ill.

ROEBLINGS Sons Co., John A., Trenton, N. J.

TRENTON Iron Co., Trenton, N. J.

WATERBURY Co., 80 South St., New York, N. Y.

WRIGHT Wire Co., Worcester, Mass.

ROPES

TOW ROPES

AMERICAN Steel & Wire Co., 208 S. La Salle St., Chicago, Ill. (See page 457.)

AUTOWLINE—See Broderick & Bascom Rope Co.

BRODERICK & Bascom Rope Co., 817 N. Second St., St. Louis, Mo. "Autowline."

HERCULES—See Leschen & Sons Rope Co.

HOGARTY, Edward, Unionville, Conn. "Utility."

JONES Auto Supply Co., 25th St. & Broadway, Oakland, Cal. "Pacific."

LESCHEN & Sons Rope Co., A., 920 N. First St., St. Louis, Mo. "Hercules."

PACIFIC—See Jones Auto Supply Co.

UTILITY—See Hogarty, Edward.

RUBBER

HARD RUBBER

(Sheet, Rod and Tube)

AMERICAN Hard Rubber Co., 9 Mercer St., New York, N. Y.

DIAMOND Rubber Co., Akron, O.

LUZERNE Rubber Co., Trenton, N. J.

SIEMON Hard Rubber Co., Bridgeport, Conn.

STOKES Rubber Co., Jos., Trenton, N. J.

WILKIE Rubber Mfg. Co., Lynn, Mass.

SCRAPERS

CARBON SCRAPERS

ATLAS Machine Co., 110 W. Exchange St., Providence, R. I.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BUFFUM Tool Co., Louisiana, Mo.

MOUND Tool Co., Seventh & Hickory Sts., St. Louis, Mo. (See page 475.)

NELSON Mfg. Co., A., 564-72 W. Randolph St., Chicago, Ill.

STEELE & Collins Co., California Bldg., Los Angeles, Cal. "Vail."

VAIL—See Steele & Collins Co.

FOOT SCRAPERS

NATIONAL Motor Supply Co., 5606 Euclid Ave., Cleveland, O.

SIMPSON Specialty Co., 179 W. Maple St., Columbus, O.

SCREENS

HORN SCREENS

AUTOMOBILE Supply Mfg. Co., 220 Taaffe Pl., Brooklyn, N. Y.

STANDARD Metal Mfg. Co., Newark, N. J. (See page 219.)

SCREW-EYES

BRASS AND IRON SCREW-EYES

BROOKS & Sons, M. S., Chester, Conn.

JENCKES Mfg. Co., E., 28 Union St., Worcester, Mass.

SARGENT & Co., Water & Wallace Sts., New Haven, Conn.

WIRE Goods Co., 28 Union St., Worcester, Mass.

SCREWS

CAP AND SET SCREWS

ALLEN Mfg. Co., 135 Sheldon St., Hartford, Conn.

BRISTOL Co., Waterbury, Conn.

AUTOMATIC Products Co., Fifth & Porter Sts., Detroit, Mich. (See page 345.)

CHICAGO Screw Co., Homan Ave. & Fillmore St., Chicago, Ill. (See pages 231 and 345.)

CLARK Bros. Bolt Co., Milldale, Conn. (See page 77.)

COLUMBUS Bolt Works, 162 W. Randolph St., Columbus, O.

CORBIN Screw Corp., 219 High St., New Britain, Conn.

CRITCHLEY Machine Screw Co., Grand St., Ct., Worcester, Mass.

CURTIS Screw Co., Buffalo, N. Y.

DETROIT Screw Works, Detroit, Mich. (See page 347.)

EASTERN Machine Screw Corp., Barclay & Truman Sts., New Haven, Conn.

FERRY Cap & Set Screw Co., 2151 Scranton Rd., Cleveland, O.

FOSTER—See New Haven Machine Screw Co.

H. & M. Screw Co., Fostoria, O.

HARTFORD Machine Screw Co., Hartford, Conn. (See page 301.)

HASKELL Mfg. Co., Wm. H., 24 Commerce St., Pawtucket, R. I.

NATIONAL-ACME Mfg. Co., Cleveland, O. (See page 395.)

NATIONAL Sewing Machine Co., Belvidere, Ill.

Complete Index to Classification appears on Pages 8 to 26.

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Front and Rear Axle Assemblies
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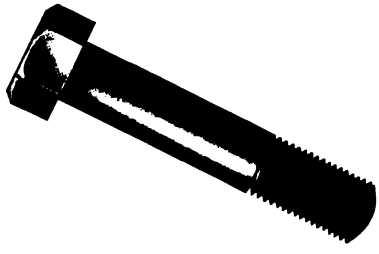

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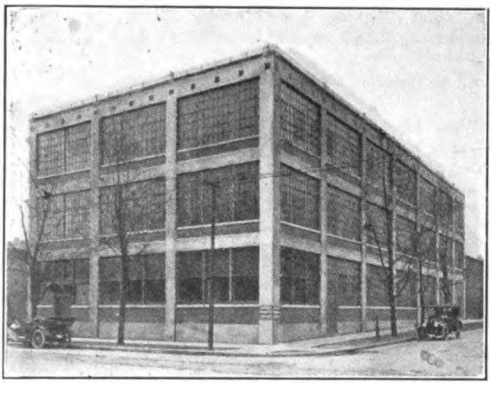

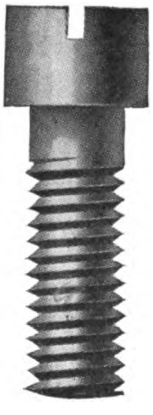

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Manufacturers of
Screw Machine Products

DETROIT 5th and Porter Streets MICHIGAN

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SCREWS (Continued)

CAP AND SET SCREWS (Continued)

NEW Haven Machine Screw Co., New Haven, Conn. "Foster."

NIAGARA Screw Co., 20 Lock St., Buffalo, N. Y.

PAWTUCKET Mfg. Co., 327 Pine St., Pawtucket, R. I.

PENINSULAR Milled Screw Co., Lafayette St., Detroit, Mich.

PITTSBURG Screw & Bolt Co., Preble Ave. (N. S.), Pittsburg, Pa.

REED & Prince Mfg. Co., Duncan Ave., Worcester, Mass.

RHODE Island Tool Co., Providence, R. I.

ROCHESTER Machine Screw Co., Caledonia St., Rochester, N. Y.

RUSSELL & Erwin Mfg. Co., 94-98 Lafayette St., New York, N. Y.

ST. LOUIS Screw Co., Clarence & Bulwer Aves., St. Louis, Mo.

SCOVILL Mfg. Co., 222 W. Lake St., Chicago, Ill.
(See page 349.)

SHIMER & Sons, Samuel J., Milton, Pa.

STANDARD Screw Co., 79 Beacon St., Worcester, Mass.

UPSON Nut Co., Unionville, Conn.

WESTERN Automatic Machine Screw Co., 750 Lake Ave., Elyria, O.
(See page 351.)

HARTFORD Machine Screw Co., Hartford, Conn.
(See page 301.)

INTERNATIONAL Machine & Screw Co., 172 Lyman St., Springfield, Mass.

MICHIGAN Screw Co., Lansing, Mich.

NATIONAL-ACME Mfg. Co., Cleveland, O.
(See page 395.)

NATIONAL Screw & Tack Co., Cleveland, O.
(See page 77.)

NEW Haven Machine Screw Co., New Haven, Conn.

PROGRESSIVE Mfg. Co., Torrington, Conn.

RAMSDELL Specialty Co., W. Boylston St., Worcester, Mass.

READING Screw Co., Norristown, Pa.

REED & Prince Mfg. Co., Duncan Ave., Worcester, Mass.

RUSSELL & Erwin Mfg. Co. 94-98 Lafayette St., New York, N. Y.

ST. LOUIS Screw Co., Clarence & Bulwer Aves., St. Louis, Mo.

SCOVILL Mfg. Co., 222 W. Lake St., Chicago, Ill.
(See page 349.)

STANDARD Screw Co., 79 Beacon St., Worcester, Mass.

STEELE & Johnson Mfg. Co., 779 S. Main St., Waterbury, Conn.

U. S. Automatic Co., Amherst, O.

WESTERN Automatic Machine Screw Co., 750 Lake Ave., Elyria, O.
(See page 351.)

COACH AND LAG SCREWS

AMERICAN Iron & Steel Mfg. Co., Front & Cumberland Sts., Lebanon, Pa.

CLARK Bros. Bolt Co., Milldale, Conn.
(See page 77.)

HASKELL Mfg. Co., Wm. H., 24 Commerce St., Pawtucket, R. I.

LAMSON & Sessions Co., 2188 Scranton Rd., Cleveland, O.

NATIONAL Screw & Tack Co., Cleveland, O.
(See page 77.)

NEW Castle Steel & Iron Co., New Castle, Pa.

OLIVER Iron & Steel Co., Pittsburg, Pa.

PAWTUCKET Mfg. Co., 327 Pine St., Pawtucket, R. I.

REPUBLIC Iron & Steel Co., Republic Bldg., Youngstown, O.

LAG SCREWS

(See Screws, Coach and Lag)

MACHINE SCREWS

AMERICAN Screw Co., Providence, R. I.

ATLAS Bolt & Screw Co., 1289 Marquette Rd., Cleveland, O.

CORBIN Screw Corp., 219 High St., New Britain, Conn.

DETROIT Screw Works, Detroit, Mich.
(See page 347.)

SET SCREWS

(See Screws, Cap and Set)

THUMB SCREWS

BILLINGS & Spencer Co., Hartford, Conn.

CHICAGO Screw Co., Homan Ave. & Fillmore St., Chicago, Ill.
(See pages 231 and 345.)

DEVLIN Mfg. Co., Thos., Third & Lehigh Aves., Philadelphia, Pa.

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

HASKELL Mfg. Co., Wm. H., 24 Commerce St., Pawtucket, R. I.

PENINSULAR Milled Screw Co., Lafayette St., Detroit, Mich.

ROCHESTER Machine Screw Co., Caledonia St., Rochester, N. Y.

ST. LOUIS Screw Co., Clarence & Bulwer Aves., St. Louis, Mo.

STEELE & Johnson Mfg. Co., 779 S. Main St., Waterbury, Conn.

WESTERN Automatic Machine Screw Co., 750 Lake Ave., Elyria, O.
(See page 351.)

WOOD SCREWS

AMERICAN Screw Co., Providence, R. I.

ATLANTIC Screw Works, Charter Oak Ave., Hartford, Conn.

BRIDGEPORT Screw Co., Bridgeport, Conn.

CORBIN Screw Corp., 219 High St., New Britain, Conn.

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SCREWS (Continued)

WOOD SCREWS (Continued)

FEDERAL Screw Corp., 393 Harris Ave., Providence, R. I.

INTERNATIONAL Machine & Screw Co., 172 Lyman St., Springfield, Mass.

NATIONAL Screw & Tack Co., Cleveland, O.
(See page 77.)

READING Screw Co., Norristown, Pa.

REED & Prince Mfg. Co., Duncan Ave., Worcester, Mass.

RUSSELL & Erwin Mfg. Co., 94-98 Lafayette St., New York, N. Y.

SCREW MACHINE PRODUCTS

SPECIAL SCREW MACHINE PRODUCTS TO ORDER

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AMERICAN Ball Co., 115 Clifford St., Providence, R. I.

AMERICAN Brass Novelty Co., Grand Haven, Mich.

AMERICAN Pin Co., Waterbury, Conn.

ANSONIA Mfg. Co., Ansonia, Conn.

ASHLEY Machine Works, 724 University Ave., Rochester, N. Y.
(See page 251.)

ATLAS Bolt & Screw Co., 1289 Marquette Rd., N. E., Cleveland, O.

ATLAS Brass Foundry Co., 980-90 S. Front St., Columbus, O.

ATTWOOD Brass Works, Scribner Ave. & Bowery St., Grand Rapids, Mich.
(See page 249.)

AUTOMATIC Products Co., Fifth & Porter Sts., Detroit, Mich.
(See page 345.)

BABSON-DOW Mfg. Co., Boston, Mass.

BALL & Roller Bearing Co., Danbury, Conn.
(See page 409.)

BARNES Co., Wallace, Wallace & Parallel Sts., Bristol, Conn.

BELVIDERE Screw & Machine Co., Belvidere, Ill.

BLAIR Tool & Machine Works, 521 Greenwich St., New York, N. Y.

BLAKE & Johnson Co., Waterbury, Conn.

BRIDGEPORT Metal Goods Mfg. Co., Howard Ave. & Spruce St., Bridgeport, Conn.

CASSADY-FAIRBANK Mfg. Co., 6106-20 La Salle St., Chicago, Ill.

CHICAGO Automatic Machine Co., Oakley Ave. & Kinzie St., Chicago, Ill.

CHICAGO-RACINE Aluminum, Brass & Iron Works, 224-30 W. Huron St., Chicago, Ill.

CHICAGO Screw Co., Homan Ave. & Fillmore St., Chicago, Ill.
(See pages 231 and 345.)

CINCINNATI Ball Crank Co., Cincinnati, O.
(See page 137.)

CLARK Novelty Co., 380 Exchange St., Rochester, N. Y.

CLIMAX Machinery Co., 143-63 E. Morris St., Indianapolis, Ind.

CLIMAX Metal Products Co., 256-57 Broadway, New York, N. Y.
(See page 551.)

CORBIN Screw Corp., 219 High St., New Britain, Conn.

CORNWALL & Patterson Mfg. Co., Bridgeport, Conn.

CRITCHLEY Machine Screw Co., Grand Street Ct., Worcester, Mass.

CURTIS Screw Co., Buffalo, N. Y.

DEFIANCE Screw Machine Products Co., Defiance, O.

DETROIT Screw Works, Detroit, Mich.
(See page 347.)

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

EASTERN Machine Screw Corp., Barclay & Truman Sts., New Haven, Conn.

ERICSSON Screw Machine Products Co., 601 Bergen St., Brooklyn, N. Y.

FARIES Mfg. Co., Decatur, Ill.

FISCHER Special Mfg. Co., 2076-78 Reading Rd., Cincinnati, O.

FRIES & Co., Buffalo, N. Y.

GARAGE Equipment Mfg. Co., Milwaukee, Wis.
(See page 83.)

GARVIN Machine Co., Spring & Varick Sts., New York, N. Y.

GLEASON-PETERS Air Pump Co., 255-61 Classon Ave., Brooklyn, N. Y.

GREER, Fredric, 525 W. Van Buren St., Chicago, Ill.

H. & M. Screw Co., Fostoria, O.

HANCOCK Mfg. Co., 770 Henry St., Charlotte, Mich.

HANSON, Henry L., 25 Union St., Worcester, Mass.

HANSON Bros., 538-48 Southington Ave., Plainville, Conn.

HARTFORD Machine Screw Co., Hartford, Conn.
(See page 301.)

HILL Co., Geo. Q., 32-34 Dorchester Ave., Boston, Mass.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

INDIANAPOLIS Tool & Mfg. Co., Indianapolis, Ind.

KALES-HASKEL Co., 441-53 Lafayette Blvd., Detroit, Mich.

KEYLESS Lock Co., 1401 Newman St., Indianapolis, Ind.

KRAHN Mfg. Co., 588 Clinton St., Milwaukee, Wis.

LENNOX Jack Works, 1104 Prospect Ave., S. E., Cleveland, O.

LIGGETT Spring & Axle Co., Monongahela, Pa.
(See page 129.)

McCULLY, R. P. & C. H., 331-35 Van Buren St., Brooklyn, N. Y.

MACHINE Parts Co., Elyria, O.

METAL Stamping Co., Racine, Wis.

MICHIGAN Screw Co., Lansing, Mich.

MILHOLLAND Machine Co., W. K., 29th & Canal Sts., Indianapolis, Ind.

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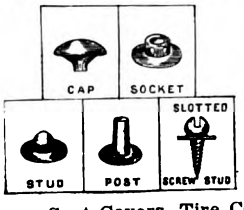

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SPECIAL SCREW MACHINE PRODUCTS TO ORDER (Continued)

MOORE, George W., 15 Chardon St., Boston, Mass.

MOSSBERG Co., Frank, Attleboro, Mass. **(See page 561.)**

NATIONAL-ACME Mfg. Co., Cleveland, O. **(See page 395.)**

NATIONAL Cycle & Mfg. Co., Bay City, Mich.

NATIONAL Sewing Machine Co., Belvidere, Ill.

NELSON Mfg. Co., A., 564-72 W. Randolph St., Chicago, Ill.

NEW Haven Machine Screw Co., New Haven, Conn.

OHIO Metal Products Co., 39 N. Edgar St., Dayton, O.

OLSON Mfg. Co., Worcester, Mass.

PEERLESS Automatic Machine Co., 1970 W. 77th St., Cleveland, O.

PENINSULAR Milled Screw Co., Lafayette St., Detroit, Mich.

PERRY-FAY Mfg. Co., Elyria, O.

PHILADELPHIA Machine Screw Works, 624-26 Race St., Philadelphia, Pa.

RAMSDELL Specialty Co., W. Boylston St., Worcester, Mass.

REED & Prince Mfg. Co., Duncan Ave., Worcester, Mass.

REESE Machine & Tool Works, S., 224-30 W. Main St., Plymouth, Pa.

RHODE Island Tool Co., Providence, R. I.

ROSS Machine Co., 208 S. Fourth St., La Fayette, Ind.

RUMMEL Machine Screw Co., 1978-80 W. 77th St., Cleveland, O.

ST. LOUIS Screw Co., Clarence & Bulwer Aves., St. Louis, Mo.

SCOVILL Mfg. Co., 222 W. Lake St., Chicago, Ill. **(See page 349.)**

SCREW Machine Products Corp., 1012 Eddy St., Providence, R. I.

SIER-BATH Co., 143 W. 54th St., New York, N. Y. **(See page 437.)**

SMITH Mfg. Co., F. H., 3037 Carroll Ave., Chicago, Ill.

SNOW-DOLE-RICHARDS Co., 9-15 Murray St., New York, N. Y.

STANDARD Engineering Works, 90 Exchange St., Pawtucket, R. I.

STANDARD Mfg. Co., 990 Housatonic Ave., Bridgeport, Conn.

STANDARD Screw Co., 79 Beacon St., Worcester, Mass.

STEELE & Johnson Mfg. Co., 779 S. Main St., Waterbury, Conn.

SUPERIOR Lamp Mfg. Co., 136 W. 52d St., New York, N. Y.

SWOPE-McCRACKEN Co., Elks Temple, Detroit, Mich.

TORRINGTON Mfg. Co., Torrington, Conn.

U. S. Automatic Co., Amherst, O.

UNIVERSAL Machine Co., 501 E. Preston St., Baltimore, Md.

VOELKNER & Harry Mfg. Co., 282-92 Woodbridge St., E., Detroit, Mich.

WATERBURY Mfg. Co., Waterbury, Conn.

WATKINS Co., D. M., Pine & Eddy Sts., Providence, R. I.

WELMADE Screw & Mfg. Co., Fitchburg, Mass.

WESTERN Automatic Machine Screw Co., 750 Lake Ave., Elyria, O. **(See page 351.)**

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. **(See page 293.)**

WESTERN Screw-Products Co., 3200-14 S. Seventh St., St. Louis, Mo.

WOLVERINE Screw Co., 51-53 Fort St., E., Detroit, Mich.

SEARCHLIGHTS

ACETYLENE SEARCHLIGHTS

(See Lamps, Acetylene)

ELECTRIC SEARCHLIGHTS

(See Headlights, Electric)

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BUFFINGTON & Co., C. A., Berkshire, N. Y.

EMPIRE Gear & Top Co., 207 N. 22d St., Philadelphia, Pa.

EUREKA Seat Co., 407-11 Rhode Island Ave., Buffalo, N. Y.

HILL Mfg. Co., 25-27 Fuller St., Buffalo, N. Y.

HODGE & Graves Co., Amesbury, Mass. "Luxury." **(See page 451.)**

KIMBALL & Co., C. P., Chicago, Ill. **(See page 87.)**

LUXURY—See Hodge & Graves Co.

McKINNON Dash Co., 252 Amherst St., Buffalo, N. Y.

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

POLSON Mfg. Co., 27 Chenango St., Buffalo, N. Y.

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(See also Holders, Top)

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AMESBURY Brass & Foundry Co., Amesbury, Mass.

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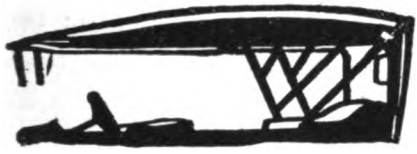

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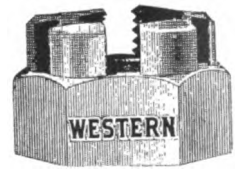

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SEPARATORS (Continued)

BOW SEPARATORS (Continued)

ATTWOOD Brass Works, Scribner Ave. & Bowery St., Grand Rapids, Mich.
(See page 249.)

AUTO Specialties Mfg. Co., 306 Fisher Bldg., Chicago, Ill. "Bair."
(See page 351.)

BAIR—See Auto Specialties Mfg. Co.

CANFIELD Rubber Co., Bridgeport, Conn.

COWLES & Co., C., New Haven, Conn.
(See page 87.)

CRANDAL, Stone & Co., Binghamton, N. Y.
(See page 369.)

DESOCO—See Detroit Socket Co.

DETROIT Socket Co., 814 Jefferson Ave., W., Detroit, Mich, "Desoco."

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

JONAH & George, Merrimac, Mass.

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

NEVER-RUB—See Springfield Auto Top & Upholstering Co.

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y.
(See page 87.)

PARUCO—See American Para Rubber Co.

PENNSYLVANIA Rubber Co., Jeannette, Pa.

SCHERER & Co., H., Detroit, Mich.

SMITH & Co., Jos. N., Detroit, Mich.
(See page 547.)

SPRINGFIELD Auto Top & Upholstering Co., 224-30 Dwight St., Springfield, Mass. "Never-Rub."

THOMPSON Mfg. Co., Watertown, Mass.

UFASCO—See Unique Findings & Supply Co.

UNIQUE Findings & Supply Co., 36 Garnet St., Providence, R. I. "Ufasco."

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

WIENER-BARNET Co., 312-28 Adams St., Newark, N. J.
(See page 249.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

GASOLINE SEPARATORS

(See Strainers, Gasoline)

SHAFTING

FLEXIBLE SHAFTING

BREEZE Carbureter Co., 250-52 South St., Newark, N. J.

COATES Clipper Mfg. Co., 237 Chandler St., Worcester, Mass.

COOPER Flexible Transmission Co., Eighth Ave. & 18th St., Brooklyn, N. Y.

GEM Mfg. Co., 3251 Spruce St., Pittsburg, Pa.

INTERLOCKED Metallic Hose Co., Orchard & Scott Sts., Newark, N. J.

NEW Jersey Flexible Shaft & Machine Co., 52-60 Dickerson St., Newark, N. J.

P R Mfg. Co., 621 Bellevue Ave., Detroit, Mich.

STOW Flexible Shaft Co., 26th & Callowhill Sts., Philadelphia, Pa.

WEBB Mfg. Co., ft. Center St., Newark, N. J.
(See page 483.)

WHITE Dental Mfg. Co., S. S., 5-9 Union Sq., W., New York, N. Y.

SHAFTS

CAMSHAFTS

(See Camshafts, Finished)

COUNTERSHAFTS

(See Countershafts, Finished)

CRANKSHAFTS

(See Crankshafts; also Forgings, Drop)

FLEXIBLE SHAFTS

(See Shafting, Flexible)

PROPELLER SHAFTS

HARTFORD Auto Parts Co., Hartford, Conn.

KINSLER-BENNETT Co., 69 Vernon St., Hartford, Conn.
(See page 231.)

SALISBURY Wheel & Mfg. Co., Jamestown, N. Y.
(See page 601.)

SPICER Mfg. Co., Plainfield, N. J.
(See page 229.)

SHEAVES

SHEAVES AND PULLEYS

(For Horn and Cut-out Cables)

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

SHELLS

COPPER BOILER SHELLS

RANDOLPH-CLOWES Co., Waterbury, Conn.

STEEL BOILER SHELLS

JANNEY, Steinmetz & Co., Philadelphia, Pa.
(See page 403.)

PRESSED Steel Tank Co., West Allis, Wis.

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TONNEAU SHIELDS

AUSTER—See Fryer-Auster Co.

FRYER-AUSTER Co., 11 Pine St., Providence, R. I. "Auster." **(See page 355.)**

J. H.—See Mutual Auto Accessories Co.

MUTUAL Auto Accessories Co., 58 W. 65th St., New York, N. Y. "J. H."

WIND SHIELDS

A. B. C. O.—See Auto Brass Mfg. Co.

ACKERMAN—See Smith & Co.

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AUTO Parts Mfg. Co., Jackson & Michigan Sts., Milwaukee, Wis. "Badger."

AUTO Wind Shield Co., University Rd., Cambridge, Mass.

BADGER—See Auto Parts Mfg. Co.

BANKER Wind Shield Co., Ellsworth & Negley Aves., Pittsburg, Pa.

BEAN Windshield Co., 466 Main St., Malden, Mass.

CLARK & Son, A. N., Plainville, Conn.

COLUMBIA Tire & Top Co., 1014 Commonwealth Ave., Boston, Mass.

COLUMBUS Auto Parts Co., Columbus, O.

CONOVER—See Page Woven Wire Fence Co.

COX Brass Mfg. Co., Albany, N. Y. **(See page 357.)**

CRANMER, Harry C., 223 S. 24th St., Philadelphia, Pa. "Philadelphia."

DIAMOND Mfg. Co., Detroit, Mich.

DOUGLAS & Lomason Co. Detroit, Mich. **(See page 211.)**

DUQUESNE Auto Parts Co., 5715-17 Kirkwood St., Pittsburg, Pa.

EMPIRE Gear & Top Co., 207 N. 22d St., Philadelphia, Pa.

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Milwaukee," "Gemco." **(See page 83.)**

GEMCO—See Garage Equipment Mfg. Co.

HARTFORD Windshield Mfg. Co., 1006 S. Los Angeles St., Los Angeles, Cal.

HEARD Mfg. Co., 1318 S. Main St., Los Angeles, Cal.

KIMBALL & Co., C. P., Chicago, Ill. **(See page 87.)**

KINSEY Mfg. Co., Toledo, O. "Kinwood."

KINWOOD—See Kinsey Mfg. Co.

KRAHN Mfg. Co., 588 Clinton St., Milwaukee, Wis.

LONDON Auto Supply Co., 2540-48 Wabash Ave., Chicago, Ill.

MANHATTAN Top & Body Co., 221-23 W. 64th St., New York, N. Y.

MEDINA Stamping & Machine Co., Medina, N. Y. "Whirlwind."

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

METALWOOD Mfg. Co., Leib & Wight Sts., Detroit, Mich.

MILWAUKEE—See Garage Equipment Mfg. Co.

MOORE Co., W. J., Montague Ave. & Joy St., Caro, Mich.

MURRAY & Co., P. A., Newton, Mass.

PAGE Woven Wire Fence Co., Adrian, Mich. "Conover."

PEERLESS—See Sisson Mfg. Co.

PERFECTO Wind Deflector Co., 67 Church St., Boston, Mass.

PHILADELPHIA—See Cranmer, Harry C.

POLSON Mfg. Co., 27 Chenango St., Buffalo, N. Y.

RANDS Mfg. Co., Holden & Lincoln Aves., Detroit, Mich.

ROSTAND Mfg. Co., Milford, Conn.

SISSON Mfg. Co., 76 Main St., Buffalo, N. Y. "Peerless."

SMITH, H. Lund, 199-203 Paterson St., Paterson, N. J.

SMITH & Co., Jos. N., Detroit, Mich. "Ackerman." **(See page 547.)**

SPRINGFIELD Harness Co., 55-61 Dwight St., Springfield, Mass.

STAR Brass Works, 1721-23 Baltimore Ave., Kansas City, Mo.

SUPERIOR Mfg. Co., Ann Arbor, Mich.

TROY Carriage Sun Shade Co., Troy, O.

UNION Auto Specialties Co., Brookville, Pa.

UNIVERSAL Wind Shield Co., 1614 Prairie Ave., Chicago, Ill.

VANGUARD Mfg. Co., Detroit, Mich. **(See page 355.)**

WESTERN Auto-Body & Mfg. Co., 416-18 E. Ninth St., Los Angeles, Cal.

WHIRLWIND—See Medina Stamping & Machine Co.

SHIFTERS

AUTOMATIC GEAR SHIFTERS

CUTLER-HAMMER Mfg. Co., Milwaukee, Wis. "Vulcan." **(See page 191.)**

GRAND Rapids Show Case Co., Grand Rapids, Mich. **(See page 355.)**

GRAY—See Research Co.

LEWIS Mfg. Co., 1229 N. 51st St., Philadelphia, Pa.

MECHANO Gear Shift Co., 144 Division St., Grand Rapids, Mich.

NUWAY Mfg. Co., Otis Bldg., Chicago, Ill.

RESEARCH Co., Peoples Gas Bldg., Chicago, Ill. "Gray."

VULCAN—See Cutler-Hammer Mfg. Co.

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Motor Car Manufacturers:

Take advantage of our experience and great facilities; take advantage of the services of specialists; we build Windshields in exclusive design or in our standard designs and we build nothing but Windshields.

The Specialist will prevail!

Jobbers:

The most complete and comprehensive line of stock shields, prompt shipments and attractive prices and discounts—send for literature.

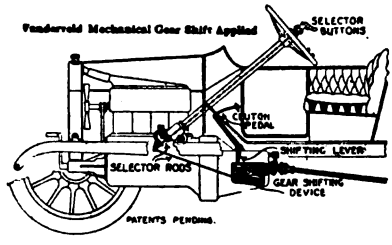
Vanguard Manufacturing Company, DETROIT MICH.

Adopt a Positive *Mechanical Gear Shift* Device for the Benefit of your Sales and Your Customers

SELECTION of gear by **Mechanical Push Button or Quadrant Lever** placed at top of steering column, gives the driver added **Comforts** and makes gear shifting a **Pleasure** in traffic, on hills and difficult roads. Eliminate the hand-gear shift lever. This **Mechanical Gear Shift** is readily mounted with practically no change necessary by the motor car builder.

Invaluable for commercial cars.

Guaranteed by a company of unsurpassed business reputation.

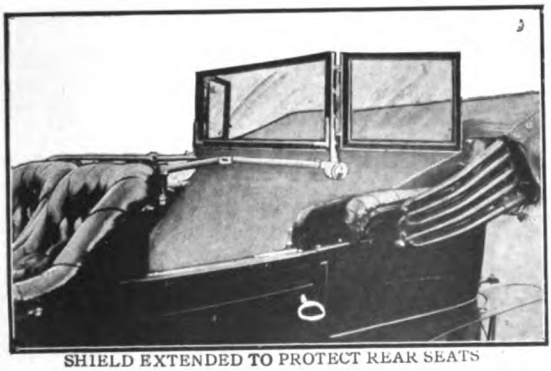


For Unit—Amidship—or Rear Axle Transmissions

Grand Rapids Show Case Co.

Engineering Dept. Grand Rapids, Mich.

The Problem of Real PROTECTION for TONNEAU SEATS



SHIELD EXTENDED TO PROTECT REAR SEATS

SOLVED AT LAST!

No Touring Car Complete Without It—
The Original Patented English Success.
Over 50,000 Already Sold in Europe.
Every Touring Car Owner a Buyer.

AUSTER TONNEAU SHIELD

(U. S. Patent 1911)

EXTENDING, FOLDING, ADJUSTABLE

Just what your trade has wanted for years. A Perfect means to protect thoroughly the rear seats against wind, dust and back-draught in all weathers. Easily attached to any car—old or new.

The Auster is the original and only satisfactory Tonneau Shield obtainable. It is instantly adjustable to any position and absolutely rigid wherever placed. Folds away close to front seat when not in use. No interference with entrance or exit of car.

Write for Liberal Dealers' Terms.

Our Guarantee Protects Your Customer and You.

Tell your customer he can use the Auster Tonneau Shield a month; then if he is not entirely satisfied with it, you will buy it back at the full price; we will do the same with you. Write for Prices and Selling Arrangement.

FRYER-AUSTER COMPANY 11 Pine Street, Providence, R. I.

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SHIMS

BRASS AND COPPER SHIMS AND LINERS

CHANDLER Co., Napier St., Springfield, Mass.

FITZGERALD Mfg. Co., Torrington, Conn.
(See page 219.)

GASKET Supply Co., 1729 Ludlow St., Philadelphia, Pa.

GOODWIN & Kintz Co., Winsted, Conn.

KALES-HASKEL CO., 441-53 Lafayette Blvd., Detroit, Mich.

KICKHAEFER Mfg. Co., 199-201 Oregon St., Milwaukee, Wis.

LAMINATED Shim Co., 537-41 Canal St., New York, N. Y.
(See page 271.)

McCORD Mfg. Co., Detroit, Mich.
(See pages 178 and 179.)

UNIQUE Findings & Supply Co., 36 Garnet St., Providence, R. I.

VICTOR Mfg. & Gasket Co., Troy & 21st Sts., Chicago, Ill.

SHOCK ABSORBERS

(See also Straps, Rebound; also Springs, Supplementary)

A. V.—See Hudson Export & Import Co.

A. & J. Mfg. Co., Binghamton, N. Y. "Mondex."

AMES—See Peacock & Co.

ANDERSON Spring Co., Detroit, Minn.

BENZ Automobile Sales Corp., 1700 Broadway, New York, N. Y. (Importers.) "Houdaille."

BOWEN Mfg. Co., Auburn, N. Y. "Empress."
(See page 151.)

BUCKEYE Suspension Co., 1253 W. Second St., Cleveland, O. "Gresser."

CONNECTICUT Shock Absorber Co., Meriden, Conn.
(See page 401.)

COX Brass Mfg. Co., Albany, N. Y. "E-Zer."
(See page 357.)

CUSHIONET—See Walker-Moore Mfg. Co.

D. & D. Air Device Co., 2132 S. Michigan Ave., Chicago, Ill.

DONNELLY Motor Equipment Co., Bush Terminal, Brooklyn, N. Y. "Ely."

E-ZER—See Cox Brass Mfg. Co.

ECLIPSE—See Herz & Co.

ELY—See Donnelly Motor Equipment Co.

EMPRESS—See Bowen Mfg. Co.

FLENTJE, Ernst, Cambridge, Mass.

GABRIEL Horn Mfg. Co., 1407 40th St., N. E., Cleveland, O.

GRESSER—See Buckeye Suspension Co.

GURNEY, C. S., Portsmouth, N. H.

HARTFORD Suspension Co., 172 Bay St., Jersey City, N. J. "Truffault-Hartford."
(See page 513.)

HERZ & Co., 245 W. 55th St., New York, N. Y. (Importers.) "Eclipse."
(See page 311.)

HOOVER Spring Co., 617-37 Turk St., San Francisco, Cal.

HOUDAILLE—See Benz Automobile Sales Corp.

HUDSON Export & Import Co., 1737 Broadway, New York, N. Y. (Importers.) "A. V."

IDEAL—See American Sales Co.

J. H. S.—See Sager Co.

KILGORE Mfg. Co., 727 Boylston St., Boston, Mass.

LANDIS Engineering & Mfg. Co., Waynesboro, Pa.

MARTIN Shock Absorber Corp., 1301-1401 E. Slauson Ave., Los Angeles, Cal.

MESINGER Mfg. Co., H. & F., Austin Pl. & E. 144th St., New York, N. Y.

MONDEX—See A. & J. Mfg. Co.

PEACOCK & Co., Clarence N., 1790 Broadway, New York, N. Y. "Ames."

PENFIELD Shock Absorber Mfg. Co., 49 Randolph Ave., Meriden, Conn.

PETELER Shock Absorber Corp., 1997 Broadway, New York, N. Y.

REX—See Rock, John G.

ROCK, John G., 452 W. Lincoln Ave., Mt. Vernon, N. Y. "Rex."

SAGER Co., J. H., 265 South Ave., Rochester, N. Y. "J. H. S."

TEMCO Electric Motor Co., Leipsic, O.

TRUFFAULT - HARTFORD — See Hartford Suspension Co.

WALKER-MOORE Mfg., Co., 310 Walker St., Racine, Wis. "Cushionet."

WESTINGHOUSE Air Spring Co., Smedley Bldg., New Haven, Conn.

SHOES

INNER TIRE SHOES

(Shoes or Sleeves to be used between outer shoe and inner tube as a protector and reinforcement. For Outer Shoes or Manchons—See Sleeves, Tire Repair)

ACME—See Jackson-Eno Rubber Co.

ALDING—See Alsten & Goulding Co.

ALSTEN & Goulding Co., 36 Foster St., Worcester, Mass. "Alding."

AMERICAN Rubber Products Co., Austin, Ill.

AMERICAN Tire & Rubber Co., 70-78 Beach St., Akron, O.

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Chemico."
(See page 131.)

ATLAS Rubber Co., 226-30 N. Jefferson st., Chicago, Ill.

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GET ACQUAINTED WITH COX

Selling Cox products to your trade increases your business and brings new customers to your store.

We have been established in this business for forty-three years and as a result the Cox trademark on any automobile accessory is a guarantee of satisfaction to owner and dealer.

The three articles here displayed are but a sample of what we have to offer you through a selling connection with us.

Write us for complete information about our products and our discounts. They are very liberal.

$8.00 Set of 4
$4.50 Set of 2

The C-C Shock Absorber for a Ford car, selling at $8.00 for a complete set of four, is the fastest selling Ford accessory on the market. Regardless of the low price the C-C is the most efficient shock absorber from the standpoint of construction and principle. Only the fact that we build them in enormous quantities makes this low price possible.

Get our discounts.

The C-C for any car selling at $10 per set complete sets a new mark in the shock absorber industry. Five years of experimenting and building shock absorbers for all types of cars, from the 1000-lb. roadster to the 5000-lb. limousine, has resulted in this C-C.

You may sell a set of these C-C's for use on the heaviest pleasure car you meet with absolute faith in their giving satisfaction, for we know their worth. We stand back of every set of C-C's. The Cox trademark is on them.

GET OUR DISCOUNTS.

$10.00
Complete

The E-Z Bumper for $5, here illustrated, is a rugged, sturdy, well-finished accessory that adorns as well as protects the car. It can be attached to any car without any difficulty or change, the adjustable notched wedge permitting the setting of the Bumper bracket at any angle to conform to the curve on frame of the car.

The E-Z is furnished in three shapes, Diamond, Round and Channel, and finished in black, black and nickel or black and brass.

Send for complete description and discounts.

We also manufacture wind shields, carbon cleaners, welding apparatus, tire pumps and bearing bronze. Send for complete information on any of the above, you'll find it well worth your while.

COX BRASS MFG. COMPANY
ALBANY Established 1872 NEW YORK

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SHOES (Continued)

INNER TIRE SHOES (Continued)

AVON—See Gray Specialty Co.

BLACK CAT—See Friday Machinery & Supply Co.

BROCKETT-GORHAM Co., N. State St., Marion, O. "Marion."

BROWNIE—See States Mfg. Co.

BUCKEYE—See Rubber Goods Supply & Mfg. Co.

BULL DOG—See Pennsylvania Rubber Co.

BULL DOG—See Polson Bros. Mfg. Co.

CHEMICO—See Atlas Auto Supply Co.

CONTINENTAL Rubber Works, Erie, Pa.

COX, David H., Chestnut St., Roselle, N. J.

DOUBLE Fabric Tire Co., 60 W. Ninth St., Auburn, Ind. "Interlock."

DYKES Co., John L. G., 222 N. State St., Chicago, Ill.

EGYPTIAN—See Polson Bros. Mfg. Co.

ESSEX Rubber Co., Trenton, N. J.

EXCEL Rubber Co., Akron, O.

FALLS Rubber Co., Cuyahoga Falls, O.

FEDERAL Rubber Mfg. Co., Milwaukee, Wis.

FIRESTONE Tire & Rubber Co., Akron, O.

FISHER Mfg. Co., 1530 N St., Lincoln, Neb.

FLEXSTEEL—See Standard Sales Co.

FRIDAY Machinery & Supply Co., Sigourney, Ia. "Black Cat."

GOODYEAR Tire & Rubber Co., Akron, O.

GRAY Specialty Co., 148 Avon Ave., Newark, N. J. "Avon."

HAGSTROM Bros. Mfg. Co., Lindsborg, Kan.

HAMPTON Mfg. Co., 1520 W. Washington St., Indianapolis, Ind. "Kant-blo."

HORSEY Mfg. Co., 6104 Euclid Ave., Cleveland, O.

IDEAL—See Voorhees Rubber Mfg. Co.

INDIA Rubber Tire Co., 1461-63 Michigan Ave., Chicago, Ill.

INDIANA Rubber & Insulated Wire Co., Jonesboro, Ind.

INNER Shoe Tire Co., Front & Allen Sts., Grand Rapids, Mich. "Innershu," "Shurhold," "Klincher."

INNERSHU—See Inner Shoe Tire Co.

INTERLOCK—See Double Fabric Tire Co.

INTERSTATE Mfg. Co., 17 Duffield St., Detroit, Mich.

INVINCIBLE Tire Co., 53 Sabin St., Providence, R. I.

JACKSON-ENO Rubber Co., 1010 S. Main St., Los Angeles, Cal. "Acme," "Peerless," "Samson," "Leech."

JOHNSON & Co., W. L., Endicott, N. Y. "Utility."

K & W Rubber Co., Orange St., Ashland, O. "Maxotire."
(See page 429.)

K-C—See Western Tire & Rubber Co.

KANT-BLO—See Hampton Mfg. Co.

KEYSTONE Rubber Mfg. Co., 125-41 E. 11th St., Erie, Pa.

KLINCHER—See Inner Shoe Tire Co.

LEATHER Tire Goods Co., Niagara Falls, N. Y. "Woodworth."
(See page 431.)

LEE Tire & Rubber Co., Conshohocken, Pa.

LEECH—See Jackson-Eno Rubber Co.

LIBERTY Rubber Co., Orange, N. J.

LION Liner Co., 1219 N. Eighth St., Sheboygan, Wis.

M. & M. Mfg. Co., Akron, O.

MARION—See Brockett-Gorham Co.

MARSHALL Tire Co., 79 Purchase St., Fall River, Mass.

MARTEL Blow-Out Protector Co., 336-38 W. 63d St., Chicago, Ill.

MATTSON Rubber Co., Lodi, N. J.
(See page 291.)

MAXOTIRE—See K & W Rubber Co.

MILLER, Chas. E., 1400 S. Meridian St., Anderson, Ind.

MODEL—See Voorhees Rubber Mfg. Co.

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill. "Rough Rider."

NEW Life Reliner Co., 499 Date St., San Diego, Cal.

O'NEIL Tire & Protector Co., W. Exchange & Water Sts., Akron, O.

PEERLESS—See Jackson-Eno Rubber Co.

PEERLESS—See Polson Bros. Mfg. Co.

PEERLESS Cement Co., 39 Viaduct, Akron, O.

PENNSYLVANIA Rubber Co., Jeannette, Pa. "Bull Dog."

PERFECT Tire Sales Co., Land Title Bldg., Philadelphia, Pa. "Reason."

POLSON Bros. Mfg. Co., 331 Southwest Blvd., Kansas City, Mo. "Bull Dog," "Egyptian," "Peerless."

QUAKER City Rubber Co., 629 Market St., Philadelphia, Pa.

REASON—See Perfect Tire Sales Co.

ROUGH RIDER—See Nemo Chemical & Specialty Mfg. Co.

RUBBER Goods Supply & Mfg. Co., Akron, O. "Buckeye."

RUTHERFORD Rubber Co., Rutherford, N. J.

SAMSON—See Jackson-Eno Rubber Co.

SECURITY Blow-out Holder Mfg. Co., Leggett Bldg., Fairfield, Ia.

SECURITY Reliner Co., 33 Meade St., Montgomery, N. Y.

SHUR-HOLD—See Inner Shoe Tire Co.

SIERRA—See Sturges Co.

STANDARD Sales Co., Hippodrome Bldg., Cleveland, O. "Flexsteel."

STAR—See States Mfg. Co.

STATES Mfg. Co., 1029-37 W. Adams St., Chicago, Ill. "Brownie," "Star."

STURGES Co., V. K., 239-12th St., Oakland, Cal. "Sierra."

THERMOID Rubber Co., Trenton, N. J.
(See page 57.)

TIRE Interlining Co., 2642 Stanton Ave., Cincinnati, O.

TRAVER Blowout Patch Co., Thoroughfare Bldg., New York, N. Y.

UNITED States Tire Co., Broadway & 58th St., New York, N. Y.

UTILITY—See Johnson & Co.

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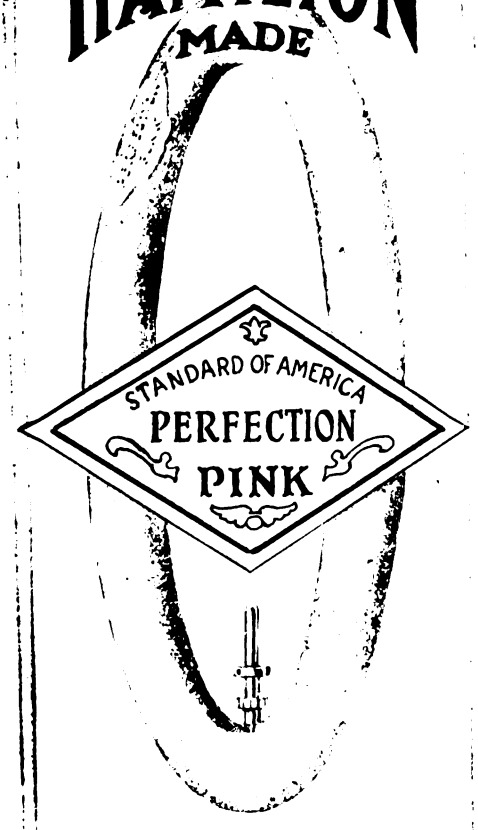


The Highest Quality Tube Producible

PERFECTION PINK TUBES

THE STANDARD OF AMERICA

It has been our ambition to produce a hand-made tube of the choicest materials and the finest workmanship. The quality is apparent all over **PERFECTION PINK TUBES** and the extra thickness will convince you at a glance of their reliable and expensive manufacture. An extra strong steam cured valve patch, and a guaranteed splice which positively cannot separate are features which have been given exceptional attention.

PERFECTION PINK TUBES are never porous, are positively uniform in quality, everyone having been given the minutest inspection with the greatest care. **PERFECTION PINK TUBES** because of their high quality and excellent construction positively retain their size and shape so that unlike other tubes, they do not stretch and make their reinsertion difficult.

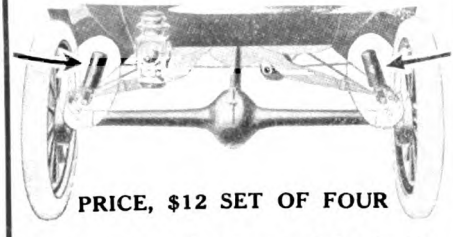
We still have some unoccupied territory which will prove highly profitable to the right representatives, for here is indeed the tube that has been looked for, **the better tube at a little better price.**

THE HAMILTON RUBBER MFG. CO.

TRENTON, N. J.

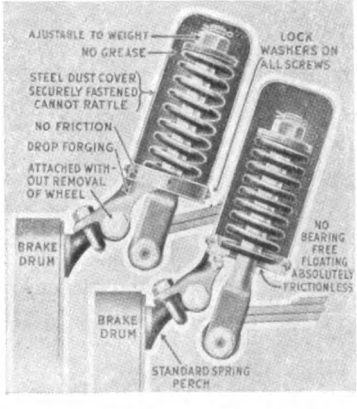
HALLADAY FRICTIONLESS SHOCK ABSORBERS for FORD CARS

Fastest selling Ford Shock Absorber on the market. 248,000 sold in 1914. Anyone can attach in twenty minutes without removing wheels—without machine work. No attention required after once installed.



PRICE, $12 SET OF FOUR

Made of drop forgings and backed by maker's guarantee. Absolutely frictionless—absolutely noiseless. A real Ford Shock Absorber at a popular price that insures quick, sure sales. Liberal dealers' discount. Write for full particulars.



Also manufacturers of Spring Leaf Lubricators, Bumpers, License Holders, Tire Holders, Oil Can Holders, Suit-Case Carriers, Supplementary Springs, Gasoline Separators, Unit Coil Ignition Systems, Automatic Jacks, etc. Write us.

L. P. HALLADAY CO., DEPT. A,

Streator, Illinois.

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SHOES (Continued)

INNER TIRE SHOES (Continued)

VOORHEES Rubber Mfg. Co., 18-46 Bostwick Ave., Jersey City, N. J. "Ideal," "Model."
(See page 291.)

WABAN Webbing Co., 207 Essex St., Boston, Mass.

WEARWELL Rubber Co., Kokomo, Ind.

WESTERN Tire & Rubber Co., 1701-03 Grand Ave., Kansas City, Mo. "K-C."

WOODWORTH—See Leather Tire Goods Co.

ZEE ZEE Tire & Rubber Co., 33d & Walnut Sts., Philadelphia, Pa.

SIGHT-FEEDS

INDEPENDENT SIGHT-FEEDS

AMERICAN Brass & Iron Co., Detroit, Mich.
(See page 211.)

CRUM-WILEY Mfg. Co., Peru, Ind.

ESSEX Brass Co., G. B., 480-86 Franklin St., Detroit, Mich.

HANCOCK Mfg. Co., 770 Henry St., Charlotte, Mich.

HANS Motor Equipment Co., La Crosse, Wis.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

KRAHN Mfg. Co., 588 Clinton St., Milwaukee, Wis.

LAVIGNE Mfg. Co., 625-41 Commonwealth Ave., Detroit, Mich.

LEE Co., Wm. O., Port Huron, Mich.
(See page 113.)

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O.

MAYO Mfg. Co., 58 E. 18th St., Chicago, Ill.
(See page 325.)

MICHIGAN Lubricator Co., 661-73 Beaubien St., Detroit, Mich.

PEDERSEN Lubricator Co., 636 First Ave., New York, N. Y.

UNITED States Gauge Co., New York, N. Y.
(See page 181.)

WILKINSON Co., Wm. H., West Medway, Mass.

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

SIGNALS

REAR TRAFFIC SIGNALS

AUTO Signalite Co., 735 Seventh Ave., New York, N. Y.

AUTOMOBILE Accessories Co., 623A Ellicott Sq., Buffalo, N. Y.
(See page 247.)

BAER Mfg. Co., North American Bldg., Philadelphia, Pa.

CAWLEY & Gurley, 4211 Cedar Ave., Cleveland, O.

COWLES & Co., C., New Haven, Conn.
(See page 87.)

DIRECTOR—See National Lamp & Signal Works.

FAWKES Auto Co., Minneapolis, Minn.

INTERNATIONAL Signal Co., 1503 Michigan Ave., Chicago, Ill. "Isco."

ISCO—See International Signal Co.

J-M MOBILITE—See Johns-Manville Co.

JOHNS-Manville Co., H. W., Madison Ave. & 41st St., New York, N. Y. "J-M Mobilite."

MOSLER & Co., A. R., Box M, Mt. Vernon, N. Y.
(See page 303.)

NATIONAL Lamp & Signal Works, Michigan Ave. & 15th St., Chicago, Ill. "Director."

QUARTETTE Automobile Signal Co., 125 W. 35th St., Los Angeles, Cal.

ROBERTS, F. C., 1226 Woodward Ave., Detroit, Mich.

ROSE Mfg. Co., 910 Arch St., Philadelphia, Pa.

ROTHERMICH, A. P., 2915 N. Taylor Ave., St. Louis, Mo.

STANDARD Signal Lamp Co., Sanford Bldg., Bridgeport, Conn.

WRIGHT & Sons Co., Wm. E., 40 Lispenard St., New York, N. Y.

SILK

SPOOL SILK

MEYER & Co., John C., Lowell, Mass.

SAUQUOIT Silk Mfg. Co., Philadelphia, Pa.

UPHOLSTERY SILK

CHENEY Bros., South Manchester, Conn.

SAUQUOIT Silk Mfg. Co., Philadelphia, Pa.

SLEEVES

TIRE REPAIR SLEEVES OR BANDS

(For lacing or strapping around a tire to close a puncture or blowout. For Sleeves to be used between inner tube and outer shoe—See Shoes, Inner Tire)

ALDING—See Alsten & Goulding Co.

ALSTEN & Goulding Co., 36 Foster St., Worcester, Mass. "Alding."

AMERICAN Para Rubber Co., 6727 S. Broadway, St. Louis, Mo. "Paruco."

AMERICAN Rubber Products Co., Austin, Ill.

ATLAS Rubber Co., 226-30 N. Jefferson St., Chicago, Ill.

BATAVIA Rubber Co., Batavia, N. Y.

BRICTSON Mfg. Co., Brookings, S. Dak.

BUCKEYE—See Rubber Goods Supply & Mfg. Co.

BULL DOG—See Polson Bros. Mfg. Co.

BULL MOOSER—See Nemo Chemical & Specialty Mfg. Co.

CENTURY—See Nemo Chemical & Specialty Mfg. Co.

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The Advertising Carried in This Issue of

THE AUTOMOBILE TRADE DIRECTORY

is that of the majority of representative manufacturers of automobile parts and accessories.

It was not contracted for and printed in this volume because its projectors pinned faith in cursory and chance perusal by those who might be leafing over its pages.

To the contrary this advertising is presented here by manufacturers who know that it will be directly referred to hundreds of times by those who contemplate direct purchase—and that it will be directly profitable.

The Automobile Trade Directory exercises its functions in exactly the manner implied by its name. It **directs** the buyer to those whose wisdom and foresight have led them to advertise in a medium of every-day value, and these buyers are men who control the expenditures involved in the construction and maintenance of every Automobile in America.

THE AUTOMOBILE TRADE DIRECTORY

Incorporated

243-249 West 39th Street, New York

DAVIS TWO CYLINDER ONE-TON TRUCK MOTORS

For absolute, dependable and reliable all-around service, the Davis 5¼" x 4¾" two-cylinder opposed one-ton truck motor cannot be equaled on the market to-day.

The Davis motor is being installed on the highest grade trucks by manufacturers everywhere.

Special features are the governor, which prevents excessive speeding of motor, thereby saving wear and tear on truck, and positive drive geared oil pump in base, absolutely assuring lubrication of all parts of the motor with no attention other than filling when required.

MR. MANUFACTURER! It will pay you to investigate the merits of Davis motors.

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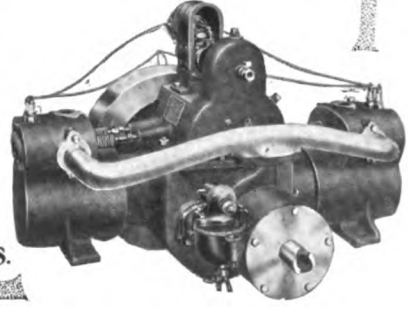

DAVIS MFG. CO.

15TH AVE & PARK ST., MILWAUKEE WIS.

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SLEEVES (Continued)

TIRE REPAIR SLEEVES OR BANDS (Continued)

CHICAGO Leather Specialty Co., 345 W. Michigan St., Chicago, Ill.

CHICAGO Rawhide Mfg. Co., 1301 Elston Ave., Chicago, Ill. "Krome."

COLORADO Tire & Leather Co., 1340 Acoma St., Denver, Colo. "Durable."

CONTINENTAL Rubber Works, Erie, Pa.

COOK & Bro., E. C., 1301-45 Carroll Ave., Chicago, Ill.

COX, David H., Chestnut St., Roselle, N. J.

DAVIS Co., W. C., 237 N. Main St., Brockton, Mass. "Star."

DOUBLE Fabric Tire Co., 60 W. Ninth St., Auburn, Ind.

DURABLE—See Colorado Tire & Leather Co.

DYKES Co., John L. G., 222 N. State St., Chicago, Ill.

ECONOMY Tread Co., 113 Lenox Ave., New York, N. Y.

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J.

ESSEX Rubber Co., Trenton, N. J.

EVERLASTING—See Legnard & Co.

EXCEL Rubber Co., Akron, O.

FALLS Rubber Co., Cuyahoga Falls, O.

FEDERAL Rubber Mfg. Co., Milwaukee, Wis.

FIRESTONE Tire & Rubber Co., Akron, O.

G & K—See Graton & Knight Mfg. Co.

GILBERT Mfg. Co., New Haven, Conn.

GOODRICH Co., B. F., Akron, O.

GOODYEAR Tire & Rubber Co., Akron, O.

GRATON & Knight Mfg. Co., Worcester, Mass. "G & K."
(See page 65.)

GRAY Specialty Co., 148 Avon Ave., Newark, N. J.

HAGER & Son, Chas., 244-46 E. 52d St., New York, N. Y.

IDEAL—See Voorhees Rubber Mfg. Co.

INDIANA Rubber & Insulated Wire Co., Jonesboro, Ind.

INNER Shoe Tire Co., Front & Allen Sts., Grand Rapids, Mich.

JACKSON-ENO Rubber Co., 1010 S. Main St., Los Angeles, Cal.

JOHNSON & Co., W. L., Endicott, N. Y. "Utility."

K & W Rubber Co., Orange St., Ashland, O.
(See page 429.)

K-C—See Western Tire & Rubber Co.

KEYSTONE Rubber Mfg. Co., 125-41 E. 11th St., Erie, Pa.

KIMBALL Tire Case Co., 168 Broadway, Council Bluffs, Ia.

KROME—See Chicago Rawhide Mfg. Co.

LEATHER Tire Goods Co., Niagara Falls, N. Y.
(See page 431.)

LEE Tire & Rubber Co., Conshohocken, Pa.

LEGNARD & Co., A. B., Waukegan, Ill. "Everlasting."

LITTLE GIANT—See Western Tire & Rubber Co.

MATTSON Rubber Co., Lodi, N. J.
(See page 291.)

MESINGER Mfg. Co., H. & F., Austin Pl. & E. 144th St., New York, N. Y.

MICHELIN Tire Co., Milltown, N. J.

MILLER, Chas. E., 1400 S. Meridian St., Anderson, Ind.

MODEL—See Voorhees Rubber Mfg. Co.

NATIONAL Leather Belting Co., 342 E. 38th St., New York, N. Y.

NEW York Leather Belting Co., 51 Beekman St., New York, N. Y.

NEMO Chemical & Specialty Mfg. Co., Thompson Bldg., Chicago, Ill. "Bull Mooser," 'Century."

O'NEIL Tire & Protector Co., W. Exchange & Water Sts., Akron, O.

PARUCO—See American Para Rubber Co.

PEERLESS Cement Co., 39 Viaduct, Akron, O.

PENNSYLVANIA Rubber Co., Jeannette, Pa.

POLSON Bros., Mfg. Co., 331 Southwest Blvd., Kansas City, Mo. "Bull Dog."

RUBBER Goods Supply & Mfg. Co., Akron, O. "Buckeye."

SAVAGE Tire Co., Main & Sicard Sts., San Diego, Cal.

STAR—See Davis Co.

STURGES Co., V. K., 239-12th St., Oakland, Cal.

TWENTIETH Century Tire Protector Co., Midlothian, Tex.

UNITED States Tire Co., Broadway & 58th St., New York, N. Y.

UNIVERSAL Tire Protector Co., Angola, Ind.

UTILITY—See Johnson & Co.

VOORHEES Rubber Mfg. Co., 18-46 Bostwick Ave., Jersey City, N. J. "Model," "Ideal."
(See page 291.)

WEARWELL Rubber Co., Kokomo, Ind.

WESTERN Tire & Rubber Co., 1701-03 Grand Ave., Kansas City, Mo. "K-C," "Little Giant."

SOAPS

AUTOMOBILE SOAPS

(See also Polishes, Automobile)

AJAX Oil & Grease Co., 170 W. 65th St., New York, N. Y.

ALDING—See Alsten & Goulding Co.

ALSTEN & Goulding Co., 36 Foster St., Worcester, Mass. "Alding."

AMALIE—See Sonneborn Sons.

AMBERZO—See Columbia Refining Co.

AMERICAN CROWN—See Kirk & Co.

AMERICAN Oil Co., Jackson, Mich. "Amoco."

AMERICAN Oil & Disinfectant Co., 196 Water St., New York, N. Y.

AMOCO—See American Oil Co.

ARCOLINE—See Atlantic Refining Co.

ARMOUR Soap Works, 31st Pl. & Benson St., Chicago, Ill. "Lustro."

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Buffalo.....698 Ellicott Square
Detroit.....911 Dime Bank Bldg.
Cleveland.....Rockefeller Building
Seattle.....580 First Avenue S.
Denver.....Lindrooth, Shubart & Co.
San Francisco....Meese & Gottfried Co.
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Birmingham.....General Machinery Co.
Los Angeles....204 N. Los Angeles St.
Minneapolis.....Link-Belt Supply Co.
Montreal, Can.....John Millen & Son, Ltd.

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SOAPS (Continued)

AUTOMOBILE SOAPS (Continued)

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Silkup."
(See page 133.)

ARNSTEIN, Eugene, 46th St. & Wentworth Ave., Chicago, Ill. "Century."

ARROW—See Peterson Co.

ATLANTIC Refining Co., Euclid Ave. & E. 65th St., Cleveland O. "Arcoline."

AUTO-KING—See Detroit Soap Co.

AUTO Oil Co., 172 S. Water St., Jackson, Mich.

BALKAN—See Jones & Bro.

BANNER Chemical Co., 2301 15th St., Denver, Colo.

BAUM'S Castorine Co., 104 N. George St., Rome, N. Y.

BELL Oil Co., 53 E. Ferry St., St. Louis, Mo. "Liberty Bell."

BLUE RIBBON—See International Metal Polish Co.

BUCKEYE—See Davies Co.

CENTURY—See Arnstein, Eugene.

CHAMBERLAIN Co., Sixth Ave. & Grant St., Pittsburg, Pa.

CHARIOT—See Fiske Bros. Refining Co.

CHEMICAL Supply Co., 1565 Merwin St., Cleveland, O.

CINCINNATI Oil Works Co., Cincinnati, O.

CLEANEASY—See Winn, Wm. R.

CLENZO—See Puritan Oil Co.

COLGATE & Co., 199 Fulton St., New York, N. Y. "Moto Bright."

COLUMBIA Refining Co., 90 West St., New York, N. Y. "Amberzo."

DAVEY & Co., 2600 Grand Ave., Chicago, Ill.

DAVIES Co., J. P., Dayton, O. "Buckeye."

DETROIT Soap Co., Detroit, Mich. "Auto-King."

DETROIT White Lead Works, 530-60 Milwaukee Ave., E., Detroit, Mich.

DIAMOND Specialty Co., Indianapolis, Ind.

DUPLEX—See Enterprise Oil Co.

DURKEE-ATWOOD Co., Minneapolis, Minn. "Rie-Nie."
(See page 131.)

EAGLE Oil & Supply Co., Boston, Mass. "Eoco."
(See page 277.)

EASTERN Supply Co., Hammond & Canterbury Sts., Worcester, Mass.

EAVENSON & Sons, J., Delaware & Penn Sts., Camden, N. J. "Jesco."

ENERGINE Refining & Mfg. Co., The Arcade, Cleveland, O.

ENTERPRISE Oil Co., 164 Chandler St., Buffalo, N. Y. "Duplex."

EOCO—See Eagle Oil & Supply Co.

ERICKA Mfg. Co., 882 Liberty St., Springfield, Mass.

FAIRCHILD & Bro., M. H., 20 W. Michigan St., Chicago, Ill.

FAULTLESS—See Hawkeye Oil Co.

FISK Mfg. Co., Springfield, Mass.

FISKE Bros. Refining Co., 24 State St., New York, N. Y. "Chariot."

FORD & DENNEN—See Richmond & Co.

FRAZER Lubricator Co., 3921 Normal Ave., Chicago, Ill.

GREAT Western Oil Co., 2855 E. 37th St., Cleveland, O.

GREEN LION—See Puritan Soap Co.

HARRIS Oil Co., A. W., 326 S. Water St., Providence, R. I.

HAWKEYE Oil Co., Waterloo, Ia. "Faultless."

HERCULES Chemical Works, 2138 W. Van Buren St., Chicago, Ill. "Non-Such."

HOLLINGSHEAD Co., R. M., Camden, N. J. "Whizoil."

HOUGHTON & Co., E. F., 240 W. Somerset St., Philadelphia, Pa.

INTERNATIONAL Metal Polish Co., Quill St. & Belt R. R., Indianapolis, Ind. "Blue Ribbon."

INTERSTATE Chemical Co., 12-20 Bayview Ave., Jersey City, N. J.

INVADER Oil Co., 80 Broad St., New York, N. Y.

JESCO—See Eavenson & Sons.

JEWEL—See Wadsworth-Howland Co.

JONES & Bro., J., 429 Locust St., Philadelphia, Pa. "Balkan."

KENNEY Mfg. Co., F., 360-68 Dorchester Ave., Boston, Mass.

KIRK & Co., James S., 106 E. Austin Ave., Chicago, Ill. "American Crown."

LIBERTY BELL—See Bell Oil Co.

LIN-O—See Strunz & Son.

LOOS & Dilworth, 134 S. Front St., Philadelphia, Pa.

LUSTRO—See Armour Soap Works.

McLEAN-JONES Oil & Supply Co., 40 India Wharf, Boston, Mass.

MAGIC—See Zurn Co.

MARATHON—See Weinberg & Co.

MILLER'S Sons, Wm. P., 298-302 Hancock St., Long Island City, N. Y. "Pan-O-Lite."

MILLERS Sons Co., A. D., 3300 Grand Blvd., Pittsburg, Pa. "Perfection."

MOBO—See Stanley, John T.

MODOC Co., Drexel Bldg., Philadelphia, Pa.

MONAHAN Antiseptic Co., 166-72 N. Curtis St., Chicago, Ill. "Simplex."

MONARCH Mfg. Co., Council Bluffs, Ia.

MONOGRAM—See New York Lubricating Oil Co.

MOORE Oil Co., York St. & McLean Ave., Cincinnati, O.

MOTO BRIGHT—See Colgate & Co.

MURPHYS—See Phoenix Oil Co.

N. W. Mfg. Co., 850 Lexington Ave., Brooklyn, N. Y.

NATIONAL Oil Products Co., 15 Bergen St., Harrison, N. J.

NATIONAL Oil & Supply Co., 180 Frelinghuysen Ave., Newark, N. J. "Viscos."

NATIONAL Refining Co., Rose Bldg., Cleveland, O.

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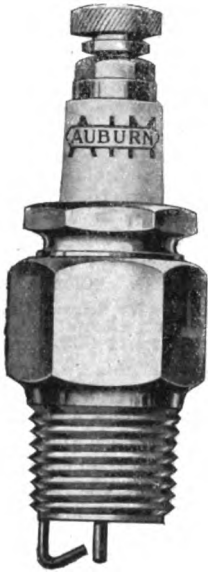

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SOAPS (Continued)

AUTOMOBILE SOAPS (Continued)

NEW YORK Lubricating Oil Co., 116 Broad St., New York, N. Y. "Monogram."
(See page 633.)

NON-SUCH—See Hercules Chemical Works.

PAN-O-LITE—See Miller's Sons.

PERFECTION—See Millers Sons Co.

PETERSON Co., T. J., Lees Bldg., Chicago, Ill. "Arrow."

PHOENIX Oil Co., 2554 W. Fifth St., Cleveland, O. "Murphys."

PIONEER Mfg. Co., 5220 Sweeney Ave., S. E., Cleveland, O. "Shino."

PURE Oil Co., First St. & 13th Ave., S., Minneapolis, Minn. "Puritan."

PURITAN—See Pure Oil Co.

PURITAN Oil Co., 1218 W. 70th St., Cleveland, O. "Clenzo."

PURITAN Soap Co., Rochester, N. Y. "Green Lion."
(See page 509.)

REXINE Co., Sheboygan, Wis.

RICHMOND & Co., C. C., 40 Batterymarch St., Boston, Mass. "Ford & Dennen.

RIE-NIE—See Durkee-Atwood Co.

SHINO—See Pioneer Mfg. Co.

SIMPLEX—See Monahan Antiseptic Co.

SLIKUP—See Arnold, N. B.

SONNEBORN Sons, L., Fulton & Pearl Sts., New York, N. Y. "Amalie."

SPEARE'S Sons Co., Alden, 140 Sixth St., Boston, Mass.

STANDARD Oil Co. of N. Y., New York, N. Y.

STANLEY, John T., 642 W. 30th St., New York, N. Y. "Mobo."
(See page 523.)

STRUNZ & Son, S., 708 Bingham St., Pittsburg, Pa. "Lin-O."

SULLIVAN Oil Co., 418 Wells St., Chicago, Ill.

TROPICAL Oil Co., W. 70th St. & L. S. & M. S. Ry., Cleveland, O.

VAN TILBURG Oil Co., 2424-28 University Ave., S. E., Minneapolis, Minn. "Wang."

VISCOS—See National Oil & Supply Co.

WADSWORTH-Howland Co., 225 Carpenter St., Chicago, Ill. "Jewel."

WANG—See Van Tilburg Oil Co.

WARREN Refining Co., 1137 W. 11th St., Cleveland, O.

WASHZUM—See White & Bagley Co.

WEINBERG & Co., J. H., 128 Maiden Lane, New York, N. Y. "Marathon."

WHITE & Bagley Co., Worcester, Mass. "Washzum."
(See Back Cover.)

WHIZOIL—See Hollingshead Co.

WINN, Wm. R., 143 Maiden Lane, New York, N. Y. "Cleaneasy."

YOUNG, Orlando W., 277 Halsey St., Newark, N. J.

ZURN Co., O. F., 2736-38 N. Broad St., Philadelphia, Pa. "Magic."

HAND SOAPS AND PASTES

ALDING—See Alsten & Goulding Co.

ALSTEN & Goulding Co., 36 Foster St., Worcester, Mass. "Alding."

ARMOUR Soap Works, 31st Pl. & Benson St., Chicago, Ill.

ARNOLD, N. B., 1 Sigourney St., Brooklyn, N. Y. "Slikup."
(See page 133.)

ARROW—See Peterson Co.

BARRABEE & Jones, 46 Columbus Ave., Boston, Mass. "Nu-Find."

BATES, Howard M., 1034 Fairmount Ave., Philadelphia, Pa. "Grit," "Rite Off."

BLUE Ribbon Mfg. Co., 27 Baldwin St. (Charlestown), Boston, Mass. "Peerless," "Premium."

CLEAN-PAW—See Frost, F. E.

CLEANEASY—See Winn, Wm. R.

CLEANZUM—See White & Bagley Co.

COLGATE & Co., 199 Fulton St., New York, N. Y.

CORLISS Supply Co., 118 Walnut St., St. Louis, Mo.

DERMALENE—See Northwestern Chemical Co.

DURKEE-ATWOOD Co., Minneapolis, Minn. "Rie-Nie."
(See page 131.)

EASTERN Supply Co., Hammond & Canterbury Sts., Worcester, Mass. "Use Me."

EAVENSON & Sons, J., Delaware & Penn Sts., Camden, N. J. "Jesco."

ERICKA Mfg. Co., 882 Liberty St., Springfield, Mass. "Itsafine."

FAULTLESS—See Hawkeye Oil Co.

FIEBING Chemical Co., 238-40 Reed St., Milwaukee, Wis. "Presto."

FINGA-BRITE—See Rath Mfg. Co.

FLASH Chemical Co., 9 Fulton Pl., Boston, Mass.

FRAZER Lubricator Co., 3921 Normal Ave., Chicago, Ill.

FROST, F. E., 505 Main St., Worcester, Mass. "Kuick Klean," "Clean-Paw," "Zip."

GIT Mfg. Co., 92 Franklin St., Westfield, Mass.

GRE-SOLVENT—See Utility Co.

GRIM-OFF—See Pitts Sanitary Co.

GRIME-OFF—See Pacific Coast Borax Co.

GRIT—See Bates, Howard M.

HANDY—See Weinberg & Co.

HAWKEYE Oil Co., Waterloo, Ia. "Faultless."

HOLLINGSHEAD Co., R. M., Camden, N. J. "Krystal Soiloff."

IMP—See Rath Mfg. Co.

ITSAFINE—See Ericka Mfg. Co.

JESCO—See Eavenson & Sons.

JEWEL—See Wadsworth-Howland Co.

KL-ENS-OL—See Northwestern Chemical Co.

KRYSTAL SOILOFF—See Hollingshead Co.

KUICK-KLEAN—See Frost, F. E.

LAVA—See Waltke & Co.

MIONE Mfg. Co., Collingdale, Pa.

MOBO—See Stanley, John T.

Complete Index to Classification appears on Pages 8 to 26.

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SOAPS (Continued)

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MONAHAN Antiseptic Co., 166-72 N. Curtis St., Chicago, Ill.

MONOGRAM—See New York Lubricating Oil Co.

N. W. Mfg. Co., 850 Lexington Ave., Brooklyn, N. Y.

NEW YORK Lubricating Oil Co., 116 Broad St., New York, N. Y. "Monogram."
(See page 633.)

NORTHWESTERN Chemical Co., Marietta, O. "Dermalene," "Kl-Ens-Ol."
(See page 131.)

NU-FIND—See Barrabee & Jones.

PACIFIC Coast Borax Co., 100 William St., New York, N. Y. "Grime-off."

PEERLESS—See Blue Ribbon Mfg. Co.

PETERSON Co., T. J., Lees Bldg., Chicago, Ill. "Arrow."

PITT Sanitary Co., 221½ W. Exchange St., Providence, R. I. "Grim-off."

PREMIUM—See Blue Ribbon Mfg. Co.

PRESTO—See Fiebing Chemical Co.

RADIUM Compound Co., Phoenix, N. Y.

RATH Mfg. Co., Hedley & Richmond Sts., Philadelphia, Pa. "Finga-Brite," "Imp."

REXINI Co., Sheboygan, Wis.

RIE-NIE—See Durkee-Atwood Co.

RITE-OFF—See Bates, Howard M.

SHOFO—See Stanley, John T.

SKIDOO—See Yeazell-Goldstein Corp.

SLIKUP—See Arnold, N. B.

STANLEY, John T., 642 W. 30th St., New York, N. Y. "Shofo," "Mobo."
(See page 523.)

TATLOCK Bros., Rochester, N. Y. "Tat's."

TAT'S—See Tatlock Bros.

UNO Mfg. Co., 6415-33 E. Ravenswood Pk., Chicago, Ill.

USE ME—See Eastern Supply Co.

UTILITY Co., 636 W. 44th St., New York, N. Y. "Gre-Solvent."

WADSWORTH-HOWLAND Co., 225 Carpenter St., Chicago, Ill. "Jewel."

WALTKE & Co., Wm., Grand Ave. & Second St., St. Louis, Mo. "Lava."

WEINBERG & Co., J. H., 128 Maiden Lane, New York, N. Y. "Handy."

WHITE & Bagley Co., Worcester, Mass. "Cleanzum."
(See Back Cover.)

WINN, Wm. R., 143 Maiden Lane, New York, N. Y. "Cleaneasy."

YEAZELL-GOLDSTEIN Corp., 489 Buttles Ave., Columbus, O. "Skidoo."

ZIP—See Frost, F. E.

SOCKETS

BOW SOCKETS

(For Slat Irons—See Irons, Slat)

AJAX—See Cortland Forging Co.

ASHTABULA Bow Socket Co., Ashtabula, O.

CLEVELAND Hardware Co., Cleveland, O.

CORTLAND Carriage Goods Co., 115 Pt. Watson St., Cortland, N. Y.

CORTLAND Forging Co., Cortland, N. Y. "Ajax."

CRANDAL, Stone & Co., Binghamton, N. Y. "Pioneer."
(See page 369.)

DESOCO—See Detroit Socket Co.

DETROIT Forging Co., 120 Mt. Elliott St., Detroit, Mich.

DETROIT Socket Co., 814 Jefferson Ave., W., Detroit, Mich. "Desoco."

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

PANTASOTE Co., 11 Broadway, New York, N. Y. "Solitaire."

PIONEER—See Crandal, Stone & Co.

SCHERER & Co., H., Detroit, Mich.

SOLITAIRE—See Pantasote Co.

ELECTRIC LAMP SOCKETS

ANCHOR—See Metal Specialties Mfg. Co.

CHICAGO Electric Mfg. Co., 2817 S. Halsted St., Chicago, Ill. "Handy."

CONNECTICUT Telephone & Electric Co., Meriden, Conn.
(See page 401.)

FRANCO—See Interstate Electric Novelty Co.

GENERAL Electric Co., Schenectady, N. Y.

HANDY—See Chicago Electric Mfg. Co.

INTERSTATE Electric Novelty Co., 29 Park Pl., New York, N. Y. "Franco."
(See page 139.)

McCANDLESS, H. W., 67-69 Park Pl., New York, N. Y.
(See page 237.)

METAL Specialties Mfg. Co., 736-38 W. Monroe St., Chicago, Ill. "Anchor."

MORSE, Frank W., 516 Atlantic Ave., Boston, Mass.

WARNE-DOUGLAS Co., Bronson, Mich.

SOLUTION

PRIMING SOLUTION

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Polar."
(See page 449.)

POLAR—See Milwaukee Auto Specialty Co.

QUIXSTART Chemical Co., Providence, R. I.

SPADES

COLLAPSIBLE SPADES AND SHOVELS

BARNARD Specialty Co., 3300 Maple Ave., Los Angeles, Cal.

WAYNESBURG Pressed Steel Co., Waynesburg, Pa.

WOOD Shovel & Tool Co., Piqua, O.

WYOMING Shovel Works, Wyoming, Pa.

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AMERICAN Ever Ready Co., 316 Hudson St., New York, N. Y. "Ever Ready."

CLEVELAND Speed Indicator Co., W. 114th St. & Locust Ave., Cleveland, O.

CORBIN BROWN—See Corbin Screw Corp.

CORBIN Screw Corp., 219 High St., New Britain, Conn. "Corbin Brown."

DETROIT Instrument Co., 251 E. Jefferson Ave., Detroit, Mich.

EVER READY—See American Ever Ready Co.

FORSE Machine Co., Pendleton, Ind.

GARFORD Mfg. Co., 2515 Taylor St., Elyria, O.

HOFFECKER Co., Motor Mart, Boston, Mass.

JONES Speedometer Co., Bush Terminal, Brooklyn, N. Y.

RECORDING Speedometer Co., Academy St., Newark, N. J.

RELIABLE Speedometer Co., 134 Eliot St., Boston, Mass.

SEARS-CROSS Co., 19-21 W. 62d St., New York, N. Y.
(See page 431.)

STANDARD Thermometer Co., 65 Shirley St., Boston, Mass.
(See page 431.)

STAR Speedometer Co., Milton, Pa.

STEWART-WARNER Speedometer Corp., 1904 Diversey Blvd., Chicago, Ill.
(See page 555.)

STOVER-LANG Co., 219-23 Columbus Ave., Boston, Mass.

TROY Carriage Sun Shade Co., Troy, O.

VAN SICKLEN Co., Aurora, Ill.
(See page 371.)

VEEDER Mfg. Co., 22 Sargeant St., Hartford, Conn.

SPOKES

WIRE SPOKES

NATIONAL Screw & Tack Co., Cleveland, O.
(See page 77.)

STANDARD Co., Torrington, Conn.

WIRE Goods Co., 28 Union St., Worcester, Mass.

SPONGES

SPONGES AND CHAMOIS

BLOCH & Sons, A., 101 Barclay St., New York, N. Y.

DAVIS & Sons, D., 45 Warren St., New York, N. Y.

FUCHS Co., Max, 244 Pearl St., New York, N. Y.

GREEK-AMERICAN Sponge Co., Franklin & Randolph Sts., Chicago, Ill. (Importers.)

LEVY Bros., 1241 Washington St., Boston, Mass. (Importers.)

NASSAU Sponge Co., 232 W. Lake St., Chicago, Ill.

NATIONAL Sponge & Chamois Co., 158 William St., New York, N. Y. (Importers.)

NIEHAUS Co., Jos., 341 Fourth Ave., W., Cincinnati, O. (Importers.)

RHODES & Co., J. H., 162 W. Kinzie St., Chicago, Ill. (Importers.)

SMITH, Kline & French Co., 429 Arch St., Philadelphia, Pa.

WESTERN Robe Mills, 43-45 Peck Ct., Chicago, Ill. (Importers.)

SPRAGS

DROP SPRAGS

(See Brakes, Drop)

SPRINGS

LEAF SPRINGS

ALLOY Steel Spring Co., Jackson, Mich.

AMERICAN Spiral Spring & Mfg. Co., 56th & Butler Sts., Pittsburg, Pa.

ANSTED Spring & Axle Co., Connersville, Ind.

ARMSTRONG Mfg. Co., J. B., Flint, Mich.

B. E. F. Auto Spring Co., 2148 Scranton Rd., Cleveland, O.

BETTS Spring Co., 888 Folsom St., San Francisco, Cal.

BUCKEYE Spring Works, 1919 Race St., Cincinnati, O.

BUFFALO Automobile Spring Co., 146 Virginia St., Buffalo, N. Y.

CAMBRIA Spring Co., 913-21 Santee St., Los Angeles, Cal.

CINCINNATI & Hammond Spring Co., 909-23 Summer St., Cincinnati, O.

CLEVELAND-CANTON Spring Co., Canton, O.
(See page 493.)

COOPER Spring Co., Main Ave. & Center St., Cleveland, O.

DELANY & Son, D., Liberty & Hamilton Sts., Newark, N. J.

DETROIT Steel Products Co., 2290 E. Grand Boulevard, Detroit, Mich.
(See page 493.)

GARDEN City Spring Works, 2300 Archer Ave., Chicago, Ill.

HARVEY Spring Co., Box 34, Racine, Wis.
(See page 373.)

HESS-PONTIAC Spring & Axle Co., Pontiac, Mich.
(See page 375.)

HESS Spring & Axle Co., Carthage, O.

HIGGINS Spring & Axle Co., 1314 16th St., Racine, Wis.
(See page 395.)

HUSTON Multiple C Spring Co., Carpenter St., Philadelphia, Pa.

IRON City Spring Co., 2916-26 Smallman St., Pittsburg, Pa.

JENKINS Mfg. Co., 1402 Chestnut St., St. Louis, Mo. "Vulcan."
(See page 491.)

KALAMAZOO Spring & Axle Co., Portage St., Kalamazoo, Mich.

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Flush Type
Actual Size

"Van"

a simplified, trouble-proof Speed-meter, that operates on the basis of the generation and calibration of a steady flowing current of air-making for infallible accuracy under every condition of service. Non-fluctuating, absolutely noiseless, not affected by temperature changes nor by altitude.

100,000-season and 100-mile trip odometer, which can be reset ten times faster than others.

Reflection-proof dial—big, easily-read indicating figures.

"The Speedmeter with the Big Black Figures"

For Factory Equipment it has no equal.

Three models: Flush type for cowlboard installation, and Bracket type, Transmission or Universal Joint Drive, specially designed to meet requirements; also Special Ford type, Front Wheel Drive. Prices right.

Sold on a money-back basis. Unconditionally guaranteed.

THE VAN SICKLEN COMPANY
AURORA ILLINOIS

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SPRINGS (Continued)

LEAF SPRINGS (Continued)

KEYSTONE Spring Works, 1313 Buttonwood St., Philadelphia, Pa.

KRUPP—See Prosser & Son.

LIGGETT Spring & Axle Co., Monongahela, Pa.
(See page 129.)

MARBURG Bros., 1790 Broadway, New York, N. Y. (Importers.) "Marburg-Hagen."
(See page 481.)

MARBURG-HAGEN—See Marburg Bros.

MATHER Spring Co., Toledo, O.
(See page 373.)

MERRILL Spring Co., E. R., 530 West 28th St., New York, N. Y.

MILLER & Van Winkle, 18 Bridge St., Brooklyn, N. Y.

NATIONAL Spring Co., New Castle, Ind.

PALMER, Jos., 333 Rutherford Ave., Boston, Mass.

PENN Spring Works, Baldwinsville, N. Y.
(See page 460.)

PERFECTION Spring Co., Central Ave. & 65th St., Cleveland, O.
(See page 599.)

PITTSBURGH Spring Co., 5915 Center Ave., Pittsburg, Pa.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp."
(See page 387.)

PULLAU Steel Spring Co., Mt. Clemens, Mich.

ROWLAND, William & Harvey (Frankford), Philadelphia, Pa.
(See page 391.)

SCRANTON Axle & Spring Co., S. Washington St., Scranton, Pa.

SHELDON Axle & Spring Co., Wilkes-Barre, Pa.
(See page 141.)

SPRING Perch Co., Bridgeport, Conn.
(See page 375.)

STANDARD Steel Spring Co., Coraopolis, Pa.

TITANIC—See Tuthill Spring Co.

TRIPLE Action Spring Co., 55-61 E. 28th St., Chicago, Ill.

TUTHILL Spring Co., 766 Polk St., Chicago, Ill. "Titanic."
(See page 271.)

VULCAN—See Jenkins Mfg. Co.

WATERTOWN Spring Works, Watertown, N. Y.

WESTERN Spring & Axle Co., 66th St. & Van Kirk Ave., Cincinnati, O.

MACHINERY SPRINGS

AMERICAN Spiral Spring & Mfg. Co., 56th & Butler Sts., Pittsburg, Pa.

AMERICAN Steel & Wire Co. 208 S. La Salle St., Chicago, Ill.
(See page 457.)

AUTO & Machine Spring Co., 106 E. 11th St., New York, N. Y.

BARNES Co., Wallace, Wallace & Parallel Sts., Bristol, Conn.

CARY Spring Works, 240 W. 29th St., New York, N. Y.

CHATILLON & Sons, John, 85-93 Cliff St., New York, N. Y.

CLEVELAND Wire Spring Co., Cleveland, O.

COOK Spring Co., 420 E. 106th St., New York, N. Y.

CUYAHOGA Spring Co., 429-35 Prospect Ave., N. W., Cleveland, O.

DUNBAR Bros. Co., Bristol, Conn.

EAGLE—See Miller & Van Winkle.

EUREKA Spring Co., 347 W. Broadway, New York, N. Y.

FISCHER Spring Co., Chas., 88-90 Walker St., New York, N. Y.

GARAGE Equipment Mfg. Co., Milwaukee, Wis.
(See page 83.)

GARDNER Wire Co., 48 Race Ave., (Austin Station), Chicago, Ill.

GIBSON Co., Wm. D., Huron & Kingsbury Sts., Chicago, Ill.
(See page 399.)

HEBB, George A., 70 William St., Newark, N. J.

HUBBARD Spring Co., M. D., Pontiac, Mich.
(See page 293.)

MILLER Wire Spring Co., Bridgeport, Conn.

MILLER & Van Winkle, 18 Bridge St., Brooklyn, N. Y. "Eagle."

MORGAN Spring Co., Worcester, Mass.

NEW Jersey Flexible Shaft & Machine Co., 52-60 Dickerson St., Newark, N. J.

N. Y. Wire & Spring Co., 586-88 Washington St., New York, N. Y.
(See page 395.)

RAILWAY Steel-Spring Co., 30 Church St., New York, N. Y.

RAYMOND Mfg. Co., W. Church St., Corry, Pa.

SABIN Machine Co., Montpelier, Vt.

TUCK Mfg. Co., 74 Ames St., Brockton, Mass.

UNITED Spring Co., 241 Centre St., New York, N. Y.

WEBB Mfg. Co., ft. Center St., Newark, N. J.
(See page 483.)

WILSON, Robert P., 320 Market St., Newark, N. J.

SEAT OR UPHOLSTERY SPRINGS

BARBER Mfg. Co., Anderson, Ind. "Cardinal."
(See page 377.)

BLACK VELVET—See National Spring & Wire Co.

CARDINAL—See Barber Mfg. Co.

CHAMPION—See Wing Co.

D'ARCY Spring Co., Kalamazoo, Mich.

DEAN & Co., Henry E., 180 Austin Ave., Worcester, Mass.

DETROIT Wire Spring Co., Detroit, Mich.
(See page 399.)

EXCELSIOR—See Trenton Spring & Mattress Co.

FOSTER Bros. Mfg. Co., 137 Broad St., Utica, N. Y.

GIBSON Co., Wm. D., Huron & Kingsbury Sts., Chicago, Ill.
(See page 399.)

Complete Index to Classification appears on Pages 8 to 26.

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MATHER SPRING Co.

Mather Springs
ARE
Scientifically Heat-Treated

That means:— GREATER ELASTICITY—
GREATER STRENGTH—
GREATER ENDURANCE—
GREATER UNIFORMITY—
GREATER LIFE—
SATISFACTION!

Genuine made only by

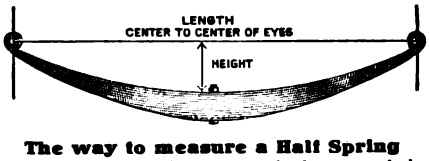
THE MATHER SPRING COMPANY
TOLEDO, OHIO

Harvey Auto Springs

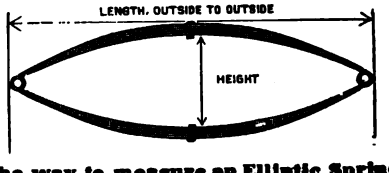
All Styles and Shapes Made to Order

The best that good steel, experience, modern facilities and skilled workmen can make. All springs are tested before leaving the factory and a careful record kept for future reference.

We are glad to give you the benefit of our experience in designing springs for new cars.



The way to measure a Half Spring
Give size of eye bolt and note whether center bolt is in center or out of center. If out of center give length of each end of spring.



The way to measure an Elliptic Spring
Always give the width of the spring, the number of leaves and the combined thickness of the leaves.

It is also well to give make and model of car. If measurements are carefully given we can replace any spring. Prompt attention and reasonable prices.

HARVEY SPRING CO. Box 34 RACINE, WIS.

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SPRINGS (Continued)

SEAT OR UPHOLSTERY SPRINGS (Continued)

JACKSON Cushion Spring Co., Jackson, Mich. "Rough Rider."
(See page 399.)

KELLEY & Co., E., 4 Cherry St., Worcester, Mass.

LACE WEB—See Trenton Spring & Mattress Co.

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

MILLER Wire Spring Co., Bridgeport, Conn.

MILLER & Van Winkle, 18 Bridge St., Brooklyn, N. Y.

MORGAN Spring Co., Worcester, Mass.

MURRAY Spring Co., Wm. A., 132 Sycamore St., Cincinnati, O.

NATIONAL Spring & Wire Co., Albion, Mich. "Black Velvet," "Rocky Road."

PERFECTION Coil Spring Co., Jackson, Mich.

ROCKY ROAD—See National Spring & Wire Co.

ROUGH RIDER—See Jackson Cushion Spring Co.

SIMMONS Mfg. Co., Kenosha, Wis.

STAPLES & Hanford Co., Newburgh, N. Y.

TRENTON Spring Mattress Co., Trenton, N. J. "Excelsior," "Lace Web."

VACO—See Vincent-Alward Co.

VINCENT-ALWARD Co., Kenosha, Wis., "Vaco."

WING Co., Charles, Amesbury, Mass. "Champion."
(See page 399.)

SUPPLEMENTARY SPRINGS

(See also Shock Absorbers; also Straps, Rebound)

ACME Torsion Spring Co., 998-1000 Boylston St., Boston, Mass.

APCO—See Auto Parts Co.

AUTO Parts Co., 702 Eddy St., Providence, R. I. "Apco."

AXWELL Equipment Co., 421 Wood St., Pittsburg, Pa.

B. & L. Auto Lamp Co., 507-09 W. 35th St., New York, N. Y. "U. S."
(See page 271.)

B & R Shock Absorber Co., 11 N. 20th St., Philadelphia, Pa.
(See page 403.)

BLACKLEDGE Mfg. Co., John W., 2110 Michigan Ave., Chicago, Ill. "Velvet."

BROWN Co., 213 Bellevue Ave., Syracuse, N. Y. "Eclipse."

COMFORT Shock Absorber Co., Hempstead, N. Y.

COX Brass Mfg. Co., Albany, N. Y. "Coxajusto."
(See page 357.)

COXAJUSTO—See Cox Brass Mfg. Co.

CUNARD Sales Co., 156 Milk St., Boston, Mass.
(See page 471.)

ECLIPSE—See Brown Co.

E-Z Rider—See Forest City Electric Co.

F-F—See France Mfg. Co.

FALKENHAINER & Co., 313 Carr St., St. Louis, Mo. "Ri-D-Z."

FLEX—See Wallace Supply Co.

FORD Shock Absorber Sales, 1339 Michigan Ave., Chicago, Ill.

FOREST City Electric Co., 5003 Windsor Ave., Cleveland, O. "E-Z Rider."
(See page 405.)

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill.

FRANCE Mfg. Co., 1434 W. 75th St., Cleveland, O. "F-F."

HALLADAY Co., L. P., Dept. A., Streator, Ill.
(See page 359.)

HARTFORD Suspension Co., 172 Bay St., Jersey City, N. J.
(See page 513.)

HASSLER, Robert H., W. Tenth & Canal Sts., Indianapolis, Ind.

HEADLIGHT Support Co., 728 Woodward Ave., Detroit, Mich.

J. M. Shock Absorber Co., 210 S. 17th St., Philadelphia, Pa.

JOHNSON—See Triple Action Spring Co.

KEYSTONE Shock Absorber Co., 1216-18 Liverpool St., N. S., Pittsburg, Pa.

KEYSTONE Spring Works, 1313 Buttonwood St., Philadelphia, Pa. "Simflex."

NATIONAL Shock Absorber Co., Grand Rapids, Mich.
(See page 513.)

PALMER Gauge Co., Dwight Bldg., Jackson, Mich.

PAR-KOP Mfg. Co., 1011 Master St., Philadelphia, Pa.

POLLEYS Pneumatic Cylinder Co., 101 Concord Ave., Cambridge, Mass.

REX—See Volute Spring Shock Absorber Co.

RI-D-Z—See Falkenhainer & Co.

ST. LOUIS Supplementary Spiral Spring Co., 4523 Delmar Ave., St. Louis, Mo.

SIMPLEX—See Keystone Spring Works.

SMITH, H. Lund, 199-203 Paterson St., Paterson, N. J.

TRIPLE Action Spring Co., 55-61 E. 28th St., Chicago, Ill. "Johnson."

U. S.—See B. & L. Auto Lamp Co.

UNIVERSAL Shock Eliminator, 3251 Broadway, New York, N. Y.
(See page 377.)

VELVET—See Blackledge Mfg. Co.

VOLUTE Spring Shock Absorber Co., Mt. Vernon, N. Y. "Rex."

WALLACE Supply Co., 412-20 Orleans St., Chicago, Ill. "Flex."

TOP STRAP SPRINGS

BON Mfg. Co., Elgin, Ill. "Elgin."

ELGIN—See Bon Mfg. Co.

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SPRINGS

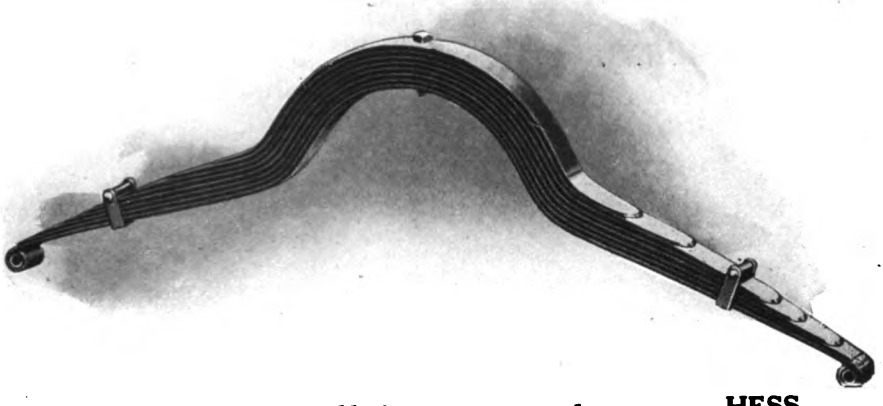
of SUPERIOR MANUFACTURE

For PLEASURE and COMMERCIAL VEHICLES

The

Spring Perch Co.

BRIDGEPORT, CONN.



Our springs are all heat treated to our special formula which is our secret triple treatment.

Chrome Vanadium and Carbon Steels

HESS-PONTIAC SPRING & AXLE COMPANY PONTIAC, MICHIGAN

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SPROCKETS

MACHINED SPROCKETS

(For Sprocket Blanks—See Castings; also Forgings; also Gears, Blank)

BALDWIN Chain & Mfg. Co., Worcester, Mass.
(See page 205.)

BILLINGS & Spencer Co., Hartford, Cann.

BOSTON Gear Works, Norfolk Downs, Mass.
(See page 185.)

CROFOOT Gear Works, Haverhill, Mass.
(See page 191.)

CROWN—See Great Western Mfg. Co.

CULLMAN Wheel Co., 1352 Greenwood Terrace, Chicago, Ill.
(See page 285.)

DIAMOND Chain & Mfg. Co., 231 W. Georgia St., Indianapolis, Ind.

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

FORG, Peter, 50 Park St., Somerville, Mass.

GREAT Western Mfg. Co., Laporte, Ind. "Crown."

NEW England Gear Works, 100 Purchase St., Boston, Mass.

PARISH & Bingham Co., Cleveland, O.
(See page 173.)

PENNSYLVANIA Gear Works, 437 N. Broad St., Philadelphia, Pa.

RUSSEL Wheel & Foundry Co., Detroit, Mich.

SIER-BATH Co., 143 W. 54th St., New York, N. Y.
(See page 437.)

STAMPINGS

STEEL STAMPINGS

ACKLIN Stamping Co., Toledo, O.

ADVANCE Machinery Co., 517-29 Hamilton St., Toledo, O.

ADVANCE Mfg. Co., Racine, Wis.

AJAX Plating & Specialty Mfg. Co., 371 Seventh St., Buffalo, N. Y.

AMERICAN Brass Novelty Co., Grand Haven, Mich.

AMERICAN Tube & Stamping Co., Bridgeport, Conn.

ASHLEY Machine Works, 724 University Ave., Rochester, N. Y.
(See page 251.)

AVERY Stamping Co., 5209 Lakeside Ave., Cleveland, O.

BAY STATE Stamping Co., 380 Chandler St., Worcester, Mass.

BETTCHER Mfg. Co., Cleveland, O.

BLAIR Tool & Machine Works, 521 Greenwich St., New York, N. Y.

BOSSERT Co., Utica, N. Y.
(See page 223.)

BOSTON Pressed Metal Co., 171-73 Union St., Worcester, Mass.

BOWEN Mfg. Co., Auburn, N. Y.
(See page 151.)

BREGWOODKRO Stamping & Mfg. Co., Lorain, O.

BRIDGEPORT Metal Goods Mfg. Co., Howard Ave. & Spruce St., Bridgeport, Conn.

BRISCOE Mfg. Co., Woodward & Baltimore Aves., Detroit, Mich.
(See page 381.)

BUFFALO Pressed Steel Co., Military Rd. & Lansing St., Buffalo, N. Y.

BURNS & Bassick Co., Bridgeport, Conn.
(See page 195.)

BURR Mfg. Co., 2108 Superior Ave., N. W., Cleveland, O.

CASSADY-FAIRBANK Mfg. Co., 6106-30 La Salle St., Chicago, Ill.

CHICAGO-RACINE Aluminum, Brass & Iron Works, 224-30 W. Huron St., Chicago, Ill.

CLIMAX Metal Products Co., 256-57 Broadway, New York, N. Y.
(See page 551.)

CONSOLIDATED Mfg. Co., Toledo, O.

CROSBY Co., Buffalo, N. Y.
(See page 157.)

CROWE Name Plate & Engraving Co., Chicago, Ill.
(See page 309.)

CUSTER Coupling Co., Bradford, Pa.

DETROIT Auto Specialty Co., 909-11 Greenwood Ave., Detroit, Mich.

DETROIT Pressed Steel Co., 1800 Mt. Elliott Ave., Detroit, Mich.
(See page 555.)

DIAMOND Mfg. Co., Detroit, Mich.

DISSTON & Sons, Henry, (Tacony), Philadelphia, Pa.

DRIGGS - SEABURY Ordnance Corp., Sharon, Pa.
(See page 157.)

EASTERN Machine & Stamping Co., 15 Wickenden St., Providence, R. I.

ENGLAND Mfg. Co., 1559 Jefferson Ave., W., Detroit, Mich.

ERIE Stamping & Mfg. Co., 644-48 W. 12th St., Erie, Pa.

EVERETT Mfg. Co., 162-64 N. May St., Chicago, Ill.

FANNER Mfg. Co., Brookside Pk., Cleveland, O.

FARIES Mfg. Co., Decatur, Ill.

FEDERAL Pressed Steel Co., Milwaukee, Wis.
(See page 157.)

FORG, Peter, 50 Park St., Somerville, Mass.

FORSYTH Bros. Co., Harvey, Ill.

FORT DEARBORN Mfg. Co., 1574-80 Crossing St., Chicago, Ill.

FRIES & Co., Buffalo, N. Y.

GARAGE Equipment Mfg. Co., Milwaukee, Wis.
(See page 83.)

GASKET Supply Co., 1729 Ludlow St., Philadelphia, Pa.

GEM Mfg. Co., 3251 Spruce St., Pittsburg, Pa.

GEM Stamped Steel Co., Everett Ave. & Blvd., (Chelsea Station), Boston, Mass.

GEUDER, Paeschke & Frey Co., 1363-1700 St. Paul Ave., Milwaukee, Wis.
(See page 169.)

GIER & Dail Mfg. Co., Lansing, Mich.

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O.
(See page 81.)

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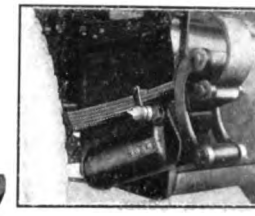


UNIVERSAL SHOCK ELIMINATOR

DEALERS TAKE NOTICE!

The UNIVERSAL SHOCK ELIMINATOR adds safety and stability by giving immediate and continuous response to every jolt, sway or vibration caused by road inequalities.
A thoroughly designed appliance for protecting the car and insuring easy riding.
Reduces tire expense; can be applied readily to any car; hundreds in use.

It is { Easier / Longer / Faster } going with the U. S. E.

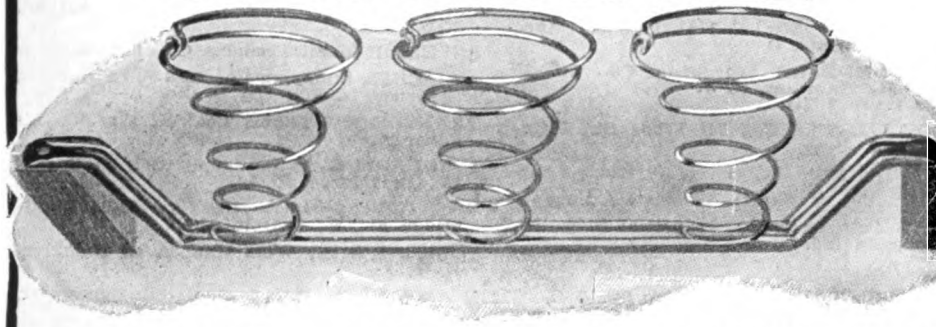
PRICES: For cars under 2000 pounds: Front set including bumper.....$40.00
Rear set for platform or ¾ elliptic..... 30.00
For cars over 2000 pounds: Front set including bumper..... 60.00
Rear set for platform or ¾ elliptic..... 40.00

MADE TO FIT ALL TYPES OF SPRINGS

UNIVERSAL SHOCK ELIMINATOR, Inc., 3251 Broadway, New York, N. Y.

TELEPHONE 2164 MORNINGSIDE

The CARDINAL



The Ideal Cushion and Seat Spring. Maximum Strength with Minimum Weight and Material. . . Perfect Construction.

ALL spirals in our spring work are made from the highest grade of spring wire, re-tempered, making it particularly strong and elastic. The spirals are firmly seated in a tempered steel arch with edges turned upward. They are absolutely noiseless, with greatest strength and durability. The very severest punishment the cushion may receive will not strain or injure it.

"The Cardinal" is shipped to you finished and ready for the frame—not more than thirty seconds required to spring the seat.

In your own interests, get full particulars and prices—it will pay you

BARBER MANUFACTURING COMPANY

ANDERSON, INDIANA, U. S. A.

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STAMPINGS (Continued)

STEEL STAMPINGS (Continued)

GREER, Fredric, 525 W. Van Buren St., Chicago, Ill.

HARDY Mfg. Co., Pendleton, Ind.
(See page 639.)

HAWTHORNE Mfg. Co., 38 Spruce St., Bridgeport, Conn.

HAYES-IONIA Co., Ionia, Mich.

HERO Mfg. Co., Gaul & Adams Sts., Philadelphia, Pa.

HILL Co., Geo. Q., 32-34 Dorchester Ave., Boston, Mass.

HOEFT & Co., Ashland Ave. & Kinzie St., Chicago, Ill.

HOLIHAN Mfg. Co., 21st & Jefferson Sts., Detroit, Mich.

HUNT & Dorman Mfg. Co., 2102-10 Superior Ave., N. E., Cleveland, O.

HYDRAULIC Pressed Steel Co., 3164 E. 61st St., Cleveland, O.
(See page 289.)

INDIANAPOLIS Tool & Mfg. Co., Indianapolis, Ind.

INDUSTRIAL Electric Mfg. Co., 139 Beaubien St., Detroit, Mich.

IRELAND & Matthews Mfg. Co., 51-79 Iron St., Detroit, Mich.

JANNEY, Steinmetz & Co., Philadelphia, Pa.
(See page 403.)

KALES-HASKEL Co., 441-53 Lafayette Blvd., Detroit, Mich.

KICKHAEFER Mfg. Co., 199-201 Oregon St., Milwaukee, Wis.

KINSEY Mfg. Co., Toledo, O.

KONIGSLOW Mfg. Co., Otto, E. 35th St. & Perkins Ave., Cleveland, O.

LENNOX Jack Works, 1104 Prospect Ave., S. E., Cleveland, O.

LINDHOLM Metal Stamping Co., 107-15 Erie St., Camden, N. J.
(See page 151.)

McDOWELL Mfg. Co., 541 Wood St., Pittsburg, Pa.

MATHEWS Mfg. Co., H. A., Seymour, Conn

MATTHEWS Mfg. Co., Worcester, Mass.

METAL Auto Parts Co., Industrial Bldg., Indianapolis, Ind.

METAL Specialty Co., Cincinnati, O.

METROPOLITAN Mfg. Co., 12th St., & G. T. R. R., Detroit, Mich.

MICHIGAN Stamping Co., 759-71 Bellevue Ave., Detroit, Mich.

MITCHELL & Son, G. F., 6501 Cedar Ave., Cleveland, O.

MOLINE Pressed Steel Co., East Moline, Ill.

MOORE & Co., 301 W. Grand Ave., Chicago, Ill.

MORGAN Spring Co., Worcester, Mass.

MOSSBERG Co., Frank, Attleboro, Mass.
(See page 561.)

NATIONAL Stamping & Electric Works, 419-26 Clinton St., Chicago, Ill.

NEW Britain Machine Co., 10 Bigelow St., New Britain, Conn.
(See page 519.)

NEWARK Stamping Co., Newark, O.

OAKES Pressed Steel Co., Indianapolis, Ind.

PARISH Mfg. Co., Reading, Pa.
(See page 481.)

PARISH & Bingham Co., Cleveland, O.
(See page 173.)

PARKER White Metal & Machine Co., Erie, Pa.
(See page 495.)

QUINSIGAMOND Pressed Steel Co., 62 Jackson St., Worcester, Mass.

R. P. K. Pressed Metal Co., Bridgeport, Conn.

RAMSDELL Specialty Co., W. Boylston St., Worcester, Mass.

ROCHESTER Pressed Steel Co., 16 Commercial St., Rochester, N. Y.

ROYAL Enameling & Mfg. Co., 336 W. Madison St., Chicago, Ill.

S. & I. Co., 53-55 Governor St., Springfield, Mass.

SCHATZ Mfg. Co., 17 Fairview Ave., Poughkeepsie, N. Y.

SESSIONS & Son, J. H., Bristol, Conn.

SMITH Co., A. O., Milwaukee, Wis.
(See page 367.)

SMITH Co., Thomas, 13 Cypress St., Worcester, Mass.

SPAFFORD Tool Works, 32 Union Pl., Hartford, Conn.

SPECIAL Machine Co., 184 John St., Bridgeport, Conn.

STAMPING & Tool Co., Third & Cass Sts., La Crosse, Wis.

STANDARD Mfg. Co., 990 Housatonic Ave., Bridgeport, Conn.

STANDARD Steel Box Co., Bridgeville, Pa.

STANDARD Tool & Mfg. Co., 72 Champlain St., Detroit, Mich.

STANLEY Works, Dept. U., New Britain, Conn.
(See page 211.)

STEARNS Stamping Co., W. H., 34 Southbridge St., Worcester, Mass.

SUPERIOR Lamp Mfg. Co., 136 W. 52d St., New York, N. Y.

SUPERIOR Metal Products Co., Elyria, O.

SYRACUSE Stamping Co., 1056 S. Clinton St., Syracuse, N. Y.

TRANSUE & Williams Co., W. Ely St., Alliance, O.

UNIQUE Findings & Supply Co., 36 Garnet St., Providence, R. I.

VOELKNER & Harry Mfg. Co., 282-92 Woodbridge St., E., Detroit, Mich.

VOGEL & Bros., Wm., Kent Ave., Brooklyn, N. Y.

W. & S. Mfg. Co., 9 Hunt St. Worcester, Mass.

WALKER-WELLS Co., Amesbury, Mass.

WILCOX Co., W. W., 1713-35 Armitage Ave., Chicago, Ill.

WORCESTER Pressed Steel Co., Worcester, Mass.
(See page 157.)

XARDELL Bros. Co., 28 Broadway, Utica, N. Y.

STANDS

WASH STAND LIGHT STANDS

(See Lights, Wash Stand)

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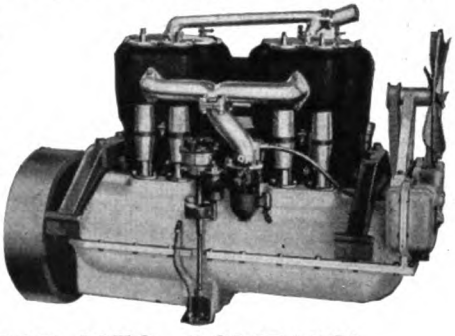
Up to the Top Without a Stop

That's the way any motor truck will take any hill if there is a sturdy

Wisconsin Motor

CONSISTENT

under the hood. No matter how steep the grade—no matter what the condition of the road, Wisconsin motors will do the work surely, consistently, powerfully and without slipping or stalling. They are specially built for heavy loads, rough roads, sand and mud, and can always be relied upon to keep going when most needed—a point where many motors stop.



In every truck it's the motor that does the work. "Wisconsin" driven trucks sell because they have been proven to be

Reliable, Powerful, Efficient

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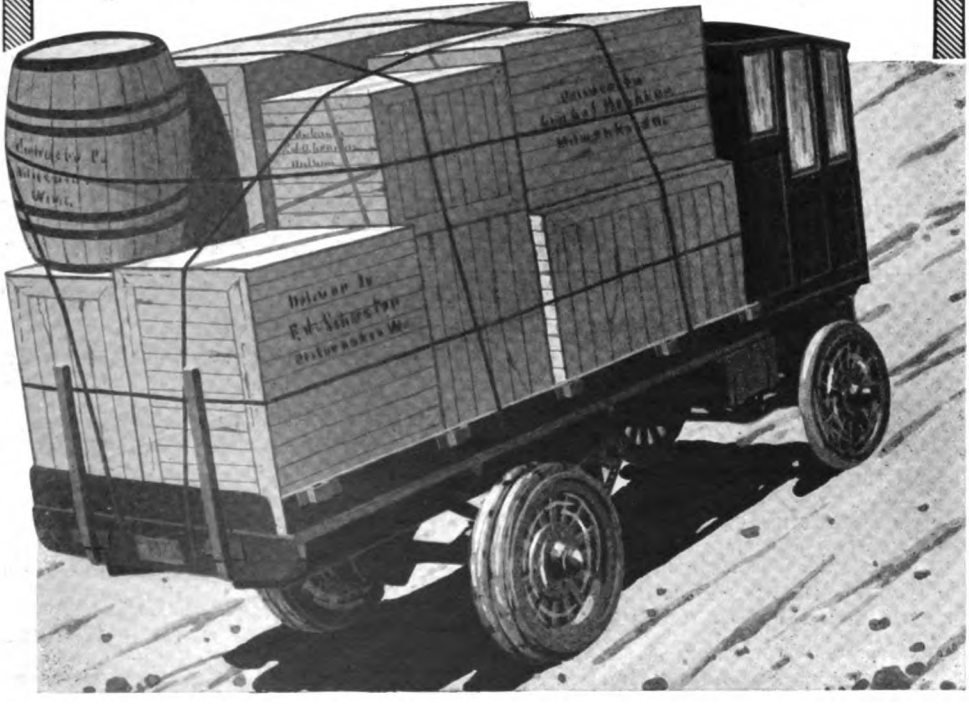
Station A, Dept. 132 MILWAUKEE, WISCONSIN



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STARTERS

ACETYLENE GAS ENGINE STARTERS

ACME—See Sheer Co.

COX Brass Mfg. Co., Albany, N. Y. "Crankless." (See page 357.)

CRANKLESS—See Cox Brass Mfg. Co.

CRARY—See T. C. F. Mfg. Co.

CUNO Engineering Corp., 80 S. Vine St., Meriden, Conn.

HOME Light Co., 2108 Dayton St., Chicago, Ill. "U. S."

INVINCIBLES Starter Co., Penobscot Bldg., Detroit, Mich.

METEOR Auto Tank Co., 1666 Broadway, New York, N. Y.

MONTROY Ignition Starter Co., Coahoma, Miss.

POLSON Mfg. Co., 27 Chenango St., Buffalo, N. Y.

PREST-O-LITE Co., 1400 Speedway, Indianapolis Ind. (See page 515.)

REKAR Automatic Starter Co., David Hewes Bldg., San Francisco, Cal.

SHEER Co., H. M., Quincy, Ill. "Acme."

T.A.D.—See Toledo Auto Devices Co.

TATE—See United Motor Equipment Co.

TIMME, A. F., 315 Mineral St., Milwaukee, Wis.

TOLEDO Auto Devices Co., Gardner Bldg., Toledo, O. "T. A. D."

U. S.—See Home Light Co.

UNITED Motor Equipment Co., 2436 S. Michigan Ave., Chicago, Ill. "Tate."

VIM Mfg. Co., Clark Ave. & 61st St., Cleveland, O.

COMPRESSED AIR ENGINE STARTERS

AMERICAN Motor Utilities Co., Singer Bldg., New York, N. Y. "Compton."

AUTO Air Appliance Co., Industrial Bldg., Baltimore, Md. "Crouse."

AUTO Air-Rotor Co., 10 Garden St., Auburn, N. Y.

CHRISTENSEN Engineering Co., 341-47 30th St., Milwaukee, Wis.

COMPTON—See American Motor Utilities Co.

CRESCENT Co., 1199 Woodward Ave., Detroit, Mich.

CROUSE—See Auto Air Appliance Co.

GEMMER-DETROIT Starter Co., Ford Bldg., Detroit, Mich.

GOODWIN & Miles Co., San Francisco, Cal.

HAM-MEIX Mfg. Co., W. 11th St. & Belt Railroad, Indianapolis, Ind. "H & M."

H & M—See Ham-Meix Mfg. Co.

JANNEY, Steinmetz & Co., Philadelphia, Pa. (See page 403.)

KELLOGG Mfg. Co., Rochester, N. Y. (See page 325.)

KILGORE Motor Starter Co., Barrister's Hall, Boston, Mass.

LIPMAN Air Appliance Co., Beloit, Wis.

LOMBARD Mfg. Co., Cutler Bldg., Rochester, N. Y.

MANZEL Bros. Co., 320 Babcock St., Buffalo, N. Y. (See page 321.)

NORTHERN Engineering Works, 2 Chene St., Detroit, Mich. "Thurber."

ROTH-MURPHY Engine Starter Co., Lemcke Bldg., Indianapolis, Ind.

SHIMPF Starter Co., 178 Devonshire St., Boston, Mass.

SMITH, Irvin C., 925 Santee St., Los Angeles, Cal.

STANDARD Appliance Co., Franklin, Pa.

THURBER—See Northern Engineering Wks.

ELECTRIC ENGINE STARTERS

ADAMS-BAGNALL Electric Co., Cleveland, O.

ADAMS & Westlake Co., Chicago, Ill. "Adlake." (See page 153.)

ADLAKE—See Adams & Westlake Co.

ALLIS-CHALMERS Mfg. Co., Milwaukee, Wis.

APELCO—See Apple Electric Co.

APPLE Electric Co., Newark, N. J. "Apelco."

AUTO-LITE—See Electric Auto-Lite Co.

BIJOU Motor Lighting Co., 15th St. & River Front, Hoboken, N. J.

BOSCH Magneto Co., 223 W. 46th St., New York, N. Y.

BRIGGS Magneto Co., Elkhart, Ind.

DAYTON-DICK Co., Quincy, Ill.

DAYTON Engineering Laboratories Co., Dayton, O. "Delco."

DEACO—See Detroit Electric Appliance Co.

DELCO—See Dayton Engineering Laboratories Co.

DETROIT Electric Appliance Co., 264-68 Jefferson Ave., Detroit, Mich. "Deaco."

DETROIT Starter Co., 940 Jefferson Ave., E., Detroit, Mich.

DISCO Electric Starter Co., Detroit, Mich. (See page 647.)

DUNNING—See Schwier Mfg. Co.

DYNETO Electric Co., Syracuse, N. Y., "Entz." (See page 259.)

ECONOMY Electric Co., Ambridge, Pa.

ELECTRIC Auto-Lite Co., Toledo, O. "Auto-Lite." (See page 381.)

ELECTRICAL Engineering & Storage Battery Co., Hume-Mansure Bldg., Sandy Hook, Conn. "Integral."

EMERSON Electric Mfg. Co., 2024-32 Washington Ave., St. Louis, Mo.

ENTZ—See Dyneto Electric Co.

ESTERLINE Co., 228 E. South St., Indianapolis, Ind.

FISHER Electrical Works, 2000 Larned St., W., Detroit, Mich.

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Real Service Efficiency

WE are constantly searching out the best establishments in the country to uphold Auto-Lite Service ideals. They are not easily found.

Auto-Lite traveling representatives are always working diligently and persistently towards this end. Rapidly, but carefully, they are adding new links to our transcontinental chain of service stations. Nothing is left undone to bring Auto-Lite service to the highest possible point of efficiency.

This is in spite of the fact that less than 2 per cent of all Electric Auto-Lite systems in existence have ever required service.

The Electric Auto-Lite Company

Home Office and Factory: Toledo, Ohio

New York Detroit Kansas City San Francisco

Electric Auto-Lite

STARTING — LIGHTING — IGNITION

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STARTERS (Continued)

ELECTRIC ENGINE STARTERS (Continued)

FLANDERS Co., Woodward & Warren Aves., Detroit, Mich. "Uno."

GENERAL Electric Co., Schenectady, N. Y.

GRAY & Davis, Boston, Mass. (See page 159.)

HARTFORD Suspension Co., 172 Bay St., Jersey City, N. J. (See page 513.)

HOLT Electric Co., 377 S. Pierce St., Milwaukee, Wis.

INST Lighter Co., 59 E. Main St., Columbus, O.

INTEGRAL—See Electrical Engineering & Storage Battery Co.

JENNEY Electric Corp., Canal & Tenth Sts., Indianapolis, Ind.

JESCO—See Jones Electric Starter Co.

JONES Electric Starter Co., 1401 W. Jackson Blvd., Chicago, Ill. "Jesco."

KEMCO Electric Mfg. Co., 2229 Ashland Rd., Cleveland, O.

L-N—See Leece-Neville Co.

LEECE-NEVILLE Co., 2069 E. Fourth St., Cleveland, O. "L-N."

LEONARD Electric Co., Ward, Bronxville, N. Y.

LOMBARD Mfg. Co., Cutler Bldg., Rochester, N. Y.

M. R. T. Electric Light & Starter Co., Des Moines, Ia.

MAXIMUM Electrical Co., 264-68 Jefferson Ave., E., Detroit, Mich.

NORTH East Electric Co., Rochester, N. Y. (See page 531.)

OTHO Motor Co., 45 Milk St., Boston, Mass.

REMY Electric Co., Anderson, Ind. (See page 427.)

SAMSON Engineering Co., Louisville, Ky.

SCHWIER Mfg Co., H. F., Boydell Bldg., Detroit, Mich. "Dunning." (See page 121.)

U-S-L—See U. S. Light & Heating Co.

U. S. Light & Heating Co., Niagara Falls, N. Y. "U-S-L." (See page 385.)

UNO—See Flanders Co.

WAGNER Electric Mfg. Co., 6400 Plymouth Ave., St. Louis, Mo.

WELLS Mfg. Co., R. C., Fond du Lac, Wis.

WESTINGHOUSE Electric & Mfg. Co. (East Pittsburg), Pittsburg, Pa.

GASOLINE OR VAPOR ENGINE STARTERS

(For Priming Devices—See Primers; Gasoline Engine)

AMERICAN Vapor Starter Co., 123 W. 56th St., New York, N. Y.

AUTOMATIC Starter Co., 418 N. Third St., St. Louis, Mo.

BROWN-MADDOCK Co., West Newbury, Mass.

MARKHAM Co., W. D., Clarksdale, Miss.

VAPOR Starter Co., 123 W. 56th St., New York, N. Y.

MANUAL OR PEDAL OR LEVER ENGINE STARTERS

(See also Cranks, Safety Starting)

AUTOMATIC Appliance Co., 172 Columbus Ave., Boston, Mass. "Boston." (See page 383.)

B. H. D.—See Specialties Sales Co.

BOSTON—See Automatic Appliance Co.

CENTURY Foundry Co., 1622 N. Salina St., Syracuse, N. Y. "Housel."

CLARK Crank Co., Johnson Bldg., Muncie, Ind.

GAHM Mfg. Co., Streator, Ill.

HOME Light Co., 2108 Dayton St., Chicago, Ill.

HOUSEL—See Century Foundry Co.

KNAPP Bros. Starter & Equipment Co., 24th & Central Aves., Minneapolis, Minn.

MISSOURI Sales Co., St. Louis, Mo.

MOGUL Starter Co., 1329 Michigan Ave., Chicago, Ill. (See page 421.)

MURPHY Starter Co., Ida Grove, Ia.

OVERHOLT Co., S. Henderson & Fourth Sts., Galesburg, Ill. "Over-Turn."

OVER-TURN—See Overholt Co.

PERFECTION Auto Starter Co., 1551 Broadway, Denver, Colo.

SANDBO Starter Co., 21 Sandbo Bldg., Rock Island, Ill. (See page 501.)

SIMPLEX Mfg. Co., Union Bldg., Anderson, Ind.

SPECIALTIES Sales Co., Kansas City, Mo. "B. H. D."

UNIVERSAL Mfg. Co., Racine, Wis.

MECHANICAL OR SPRING ENGINE STARTERS

AMERICAN Ever Ready Co. 316 Hudson St., New York, N. Y. "Ever Ready."

AUTOMATIC Devices Co., Galesburg, Ill. "Startzer."

DENVER Ford Starter Co., Denver, Colo.

ELDER Mfg. Co., 2305 N. Illinois St., Indianapolis, Ind.

EVER READY—See American Ever Ready Co.

GARDNER Engine Starter Co., 1451-55 Michigan Ave., Chicago, Ill.

STARTZER—See Automatic Devices Co.

TUDOR, J. W., 35 Congress St., Boston, Mass.

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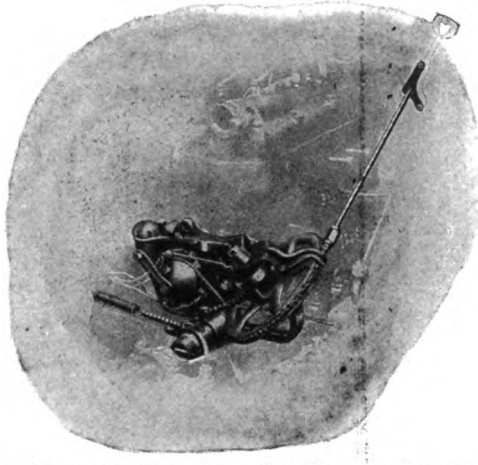
BOSTON STARTER

For Ford Automobiles

MODEL "T"

A Mechanical Device That Starts the Motor from the Driver's Seat.



Automatically Retards the Spark and Releases in Case of Backfire

Boston Starter Assembled on Car with Fan and Radiator Removed

Does not interfere with the regular Starting Crank.
Is completely concealed under the hood, except the handle.
Any one can attach it to his own car.

Write for further particulars.

Manufactured by

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Baltimore, Md.,
Robert W. Butler,
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Schenectady, N. Y.,
Dorp Auto Company,
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Detroit, Mich.,
Wilson-Schroeter Agency,
1249 Woodward Avenue.

South Boston, Va.,
Barbour-Wilborn Hdw. Co.

Los Angeles, Cal.,
J. R. Bradford,
1044 South Olive St.

Newark, N. J.,
Ford Specialty Co.,
10 Bleecker St.

Seattle, Wash.,
L. E. Miller,
723 East Pike Street.

Louisville, Ky.,
Boston Starter Company
of Kentucky.

Syracuse, N. Y.,
F. W. Fischer,
111 East Corning Ave.

Denver, Colo.,
Bert E. Clark,
1616 Broadway.

Providence, R. I.,
William Burton,
103 Bradford Street.

Buffalo, N. Y.,
Frank X. Irr,
253 Allen Street.

Richmond, Va.,
Chemi Company.

Iowa Falls, Iowa,
Stiles & Lansing.

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(Sole distributors for export)
18 Broadway,
New York, N. Y.

Reliable Distributors for Unoccupied Territory Wanted

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STEEL

DEALERS IN STEEL

(This is a List of Dealers in Iron, Steel and other metals who advertise in this publication)

HARVEY Co., Arthur C., 374 Congress St., Boston, Mass.
(See page 475.)

MORRIS & Co., E. K., 311-17 W. Second St., Cincinnati, O.
(See page 433.)

ANGLE, CHANNEL AND TEE IRON OR STEEL

CAMBRIA Steel Co., Johnstown, Pa.

CARNEGIE Steel Co., Carnegie Bldg., Pittsburg, Pa.

ILLINOIS Steel Co., 203 S. La Salle St., Chicago, Ill.

INLAND Steel Co., First National Bank Bldg., Chicago, Ill.

JONES & Laughlin Steel Co., Pittsburg, Pa.

LOCKHART Iron & Steel Co., McKees Rocks, Pa. "Vulcan."

LOGAN Iron & Steel Co., 1421 Chestnut St., Philadelphia, Pa.

PENNSYLVANIA Steel Co., Morris Bldg., Philadelphia, Pa.
(See page 389.)

REPUBLIC Iron & Steel Co., Republic Bldg., Youngstown, O.

VULCAN—See Lockhart Iron & Steel Co.

BAR IRON OR STEEL

AMERICAN Iron & Steel Mfg. Co., Front & Cumberland Sts., Lebanon, Pa.

BALDWIN Steel Co., Charleston, W. Va.

CAMBRIA Steel Co., Johnstown, Pa.

FARIST Steel Co., 137 E. Main St., Bridgeport, Conn.

ILLINGSWORTH Steel Co., John (Frankford), Philadelphia, Pa.

ILLINOIS Steel Co., 203 S. La Salle St., Chicago, Ill.

INLAND Steel Co., First National Bank Bldg., Chicago, Ill.

JONES & Laughlins Steel Co., Pittsburg, Pa.

KRUPP—See Prosser & Son.

LACKAWANNA Steel Co., Buffalo, N. Y.

LOCKHART Iron & Steel Co., McKees Rocks, Pa. "Vulcan."

LOGAN Iron & Steel Co., 1421 Chestnut St., Philadelphia, Pa.

PARDEE Works, C., Perth Amboy, N. J.

PENNSYLVANIA Steel Co., Morris Bldg., Philadelphia, Pa.
(See page 389.)

PHILADELPHIA Steel & Forge Co., 50 Church St., New York, N. Y.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp."
(See page 387.)

RAILWAY Steel-Spring Co., 30 Church St., New York, N. Y.

REPUBLIC Iron & Steel Co., Republic Bldg., Youngstown, O.

UNITED Steel Co., Canton, O.
(See page 497.)

VULCAN—See Lockhart Iron & Steel Co.

SHEET STEEL

ALLEGHENY Steel Co., Brackenridge, Pa.

AMERICAN Rolling Mill Co., Middletown, O. "Middletown."

AMERICAN Sheet & Tin Plate Co., Frick Bldg., Pittsburg, Pa.

CARNAHAN Tin Plate & Sheet Co., Canton, O.

COLONIAL Steel Co., Keystone Bldg., Pittsburg, Pa.

FOLLANSBEE Bros. Co., Third & Liberty Aves., Pittsburg, Pa.

INLAND Steel Co., First National Bank Bldg., Chicago, Ill.

KRUPP—See Prosser & Son.

LA BELLE Iron Works, Steubenville, O.

McVOY Sheet & Tin Plate Co., 344-50 W. Michigan St., Chicago, Ill.

MASSILLON Rolling Mill Co., Massillon, O.
(See page 483.)

MIDDLETOWN—See American Rolling Mill Co.

PARKERSBURG Iron & Steel Co., Parkersburg, W. Va.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp."
(See page 387.)

TAYLOR Co., N. & G., Chestnut & Third Sts., Philadelphia, Pa.

YOUNGSTOWN Sheet & Tube Co., Youngstown, O.

COLD ROLLED BAR STEEL

CAMBRIA Steel Co., Johnstown, Pa.

COLUMBIA Steel & Shafting Co., Pittsburg, Pa.

COMPRESSED Steel Shafting Co., 393 Dorchester Ave., Boston, Mass.

CRUCIBLE Steel Co. of America, Oliver Bldg., Pittsburg, Pa.

CUMBERLAND Steel Co., Williams St. & B. & O. R. R., Cumberland, Md.

FITZSIMONS Co., Youngstown, O.

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. (Importers.) "Poldi."
(See page 425.)

JONES & Laughlins Steel Co., Pittsburg, Pa.

KRUPP—See Prosser & Son.

NEW Process Steel Corp., Lancaster, Pa.

PARDEE Works, C., Perth Amboy, N. J.

PITTSBURG Shafting Co., of Detroit, Detroit, Mich.

POLDI—See Frasse & Co.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp."
(See page 387.)

UNION Drawn Steel Co., Beaver Falls, Pa.
(See page 475.)

UNITED Steel Co., Canton, O.
(See page 497.)

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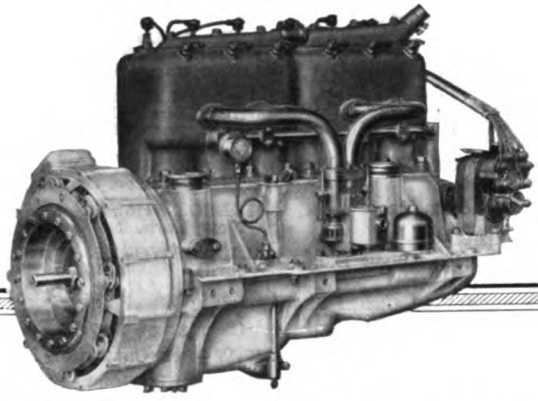

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Consider First the Simplicity

No noisy, power-consuming gears, chains or sprockets. The U-S-L Rotator—the sole moving part—bolted to the crank-shaft in place of the cast-iron fly-wheel applies its great starting power direct. No speed governors, clutches or bearings to oil.

Then the High Starting Speed

Instantly, without noise, jerk or jar, the U-S-L whirls the engine 200 to 400 R. P. M. No other starter spins the engine as fast.

Inherent Regulation—Another Exclusive U-S-L Feature

No external regulating devices are used. No energy wasted—automatic—no adjustments to make—battery charging commences at exceptionally low speed.

Write or call at our nearest Branch Office for all the U-S-L Facts.

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Electric STARTER and Lighter

Standard Equipment on

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Sheffield-Simplex (England) Rochester Motor Rayfield Fire Pump

The U. S. Light & Heating Co.
General Offices and Factory: **Niagara Falls, N. Y.**
Branch Offices and Service Stations:
Boston New York Buffalo Cleveland Detroit
Washington, D. C. Chicago St. Louis San Francisco

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STEEL (Continued)

COLD ROLLED STRIP STEEL

AMERICAN Steel & Wire Co., 208 S. La Salle St., Chicago, Ill. (See page 457.)

AMERICAN Tube & Stamping Co., Bridgeport, Conn.

CARPENTER Steel Co., Reading, Pa.

COLUMBIA Steel Co., Elyria, O.

CRUCIBLE Steel Co. of America, Oliver Bldg., Pittsburg, Pa.

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. (Importers.) "Poldi." (See page 425.)

KRUPP—See Prosser & Son.

MORRIS & Bailey Steel Co., Pittsburg, Pa.

POLDI—See Frasse & Co.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp." (See page 387.)

STANLEY Works, Dept. U., New Britain, Conn. (See page 211.)

SUPERIOR Steel Co., Carnegie, Pa.

WEST Leechburg Steel Co., Farmers Bank Bldg., Pittsburg, Pa.

TOOL STEEL

ALLEN & Co., Edgar, 718 W. Lake St., Chicago, Ill. (Importers.)

ANDREW & Co., J. H., 107 West St., New York, N. Y. (Importers.) "Toledo."

ARROW—See Crowley Co.

ATLAS Crucible Steel Co., 66 Howard Ave., Dunkirk, N. Y.

BALDWIN Steel Co., Charleston, W. Va.

BECKER Steel Co. of America, 90 West St., New York, N. Y. (Importers.)

BISCHOFF—See Elliott, H. A.

BRAEBURN Steel Co., Braeburn, Pa.

BROWN & Co., 10th St. & Duquesne Way, Pittsburg, Pa.

CARBON Steel Co., ft. 32d St., Pittsburg, Pa. "Weto," "Cromo."

CARPENTER Steel Co., Reading, Pa. "Comet," "K-W," "Stentor."

COLONIAL Steel Co., Keystone Bldg., Pittsburg, Pa. "Red Star."

COLUMBIA Tool Steel Co., Chicago Heights, Ill.

COMET—See Carpenter Steel Co.

CROMO—See Carbon Steel Co.

CROWLEY Co., John A., 120-22 Liberty St., New York, N. Y. "Arrow." (See page 405.)

CRUCIBLE Steel Co. of America, Oliver Bldg., Pittsburg, Pa.

CYCLOPS Steel Works, 265 E. Spring St., Titusville, Pa.

DANNEMORA—See Nash Co.

DANNEMORA—See Ward's Sons.

ELLIOTT, H. A., Majestic Bldg., Detroit, Mich. (Importer.) "Bischoff."

FARIST Steel Co., 137 E. Main St., Bridgeport, Conn.

FIRTH-STERLING Steel Co., McKeesport, Pa.

FOX & Co., Samuel, 44 Cliff St., New York, N. Y. (Importers.) (See page 405.)

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. (Importers.) "Poldi." (See page 425.)

HALCOMB Steel Co., Syracuse, N. Y.

HELLER Bros. Co., Newark, N. J.

HOBSON, Houghton & Co., 83 Beekman St., New York, N. Y. (Importers)

ILLINGSWORTH Steel Co., John (Frankford), Philadelphia, Pa.

JESSOP & Sons, Wm., 91 John St., New York, N. Y. (Importers.) (See page 391.)

K-W—See Carpenter Steel Co.

KREFELD Steel Co., 50 Church St., New York, N. Y. (Importers.)

KRUPP—See Prosser & Son.

LINDENBERG Steel Co., 90 West St., New York, N. Y. (Importers.)

LUDLUM Steel Co., Watervliet, N. Y. "Pompton."

McINNES Steel Co., Corry, Pa.

MIDVALE Steel Co. (Nicetown), Philadelphia, Pa.

NASH Co., Geo. 217 Pearl St., New York, N. Y. (Importers.) "Dannemora," "Solar." (See page 433.)

NEW Process Steel Corp., Lancaster, Pa.

PHILADELPHIA Steel & Forge Co., 50 Church St., New York, N. Y.

PITTSBURGH Tool Steel Wire Co., Monaca, Pa.

POLDI—See Frasse & Co.

POMPTON—See Ludlum Steel Co.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp." (See page 387.)

RED STAR—See Colonial Steel Co.

ROECHLING Electro Steel Co., 173-77 Lafayette St., New York, N. Y. (Importers.)

SOLAR—See Nash Co.

STENTOR—See Carpenter Steel Co.

VANADIUM-ALLOYS Steel Co., Latrobe, Pa. "Vasco."

VASCO—See Vanadium-Alloys Steel Co.

VULCAN Crucible Steel Co., First St., Aliquippa, Pa.

WARD'S Sons, Edgar T., 25 Purchase St., Boston, Mass. (Importers.) "Dannemora." (See page 433.)

WETO—See Carbon Steel Co.

SPRING STEEL

ARROW—See Crowley Co.

BALDWIN Steel Co., Charleston, W. Va.

BRAEBURN Steel Co., Braeburn, Pa.

CAMBRIA Steel Co., Johnstown, Pa.

CARNEGIE Steel Co., Carnegie Bldg., Pittsburg, Pa.

CARPENTER Steel Co., Reading, Pa. "Flexo."

Complete Index to Classification appears on Pages 8 to 26.

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USE KRUPP STEEL IN YOUR CARS

And Feel Satisfied and Secure

Crank Shafts, Axles, Steering Knuckles, Gears, Frame Members, Shafts and all Forgings for Motor Cars

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Nickel Steels
Chrome Nickel Steels
Vanadium Steels
Chrome Vanadium Steels
Silicon Manganese Steels
Krupp Steels

Now in Stock at New York:

Round Bars of Krupp Special **Chrome Nickel Steel,** Grade E. F. 60.0 ½" to 8" diameter for Gears, Axle Shafts, etc., having minimum elastic limit, 100,000 lbs. per square inch.

This steel can be oil or case hardened so as to have an elastic limit of over 200,000 lbs. Use this "TOUGHEST STUFF" and eliminate the breakages you are now having.

LOOK TO THE STEEL WORKS

FOR STEEL

THOMAS PROSSER & SON
15 GOLD ST. NEW YORK
Represented by
AMERICAN OFFICE.

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STEEL (Continued)

SPRING STEEL (Continued)

CROWLEY Co., John A., 120-22 Liberty St., New York, N. Y. "Arrow." (See page 405.)

FAIRLEY DAVIDSON Steel Co., 124 Maiden Lane, New York, N. Y. (Importers.) (See page 393.)

FARIST Steel Co., 137 E. Main St., Bridgeport, Conn.

FLEXO—See Carpenter Steel Co.

FOX & Co., Samuel, 44 Cliff St., New York, N. Y. (Importers.) (See page 405.)

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. "Poldi." (See page 425.)

HALCOMB Steel Co., Syracuse, N. Y.

HARROW Spring Co., Colby-Abbot Bldg., Milwaukee, Wis.

HELMUTH Co., L., 17 Battery Pl., New York, N. Y. (Importers.)

ILLINOIS Steel Co., 203 S. La Salle St., Chicago, Ill.

KREFELD Steel Co., 50 Church St., New York, N. Y. (Importers.)

KRUPP—See Prosser & Son.

MIDVALE Steel Co. (Nicetown), Philadelphia, Pa.

PENNSYLVANIA Steel Co., Morris Bldg., Philadelphia, Pa. (See page 389.)

PHILADELPHIA Steel & Forge Co., 50 Church St., New York, N. Y.

POLDI—See Frasse & Co.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp." (See page 387.)

UNITED Steel Co., Canton, O. (See page 497.)

VULCAN Crucible Steel Co., First St., Aliquippa, Pa.

MANGANESE STEEL

KRUPP—See Prosser & Son.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp." (See page 387.)

UNITED Steel Co., Canton, O. (See page 497.)

NICKEL STEEL

ALLEN & Co., Edgar, 716 W. Lake St., Chicago, Ill. (Importers.)

BALDWIN Steel Co., Charleston, W. Va.

BECKER Steel Co. of America, 90 West St., New York, N. Y. (Importers.)

CARBON Steel Co., ft. 32d St., Pittsburg, Pa. "Nico."

CARPENTER Steel Co., Reading, Pa.

COLONIAL Steel Co., Keystone Bldg., Pittsburg, Pa.

CROWLEY Co., John A., 120-22 Liberty St., New York, N. Y. (See page 405.)

CRUCIBLE Steel Co. of America, Oliver Bldg., Pittsburg, Pa.

FAIRLEY DAVIDSON Steel Co., 124 Maiden Lane, New York, N. Y. (Importers.) "Hehtemnd." (See page 393.)

FARIST Steel Co., 137 E. Main St., Bridgeport, Conn.

FITZSIMONS Co., Youngstown, O.

FOX & Co., Samuel, 44 Cliff St., New York, N. Y. (Importers.) (See page 405.)

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. (Importers.) "Poldi." (See page 425.)

HALCOMB Steel Co., Syracuse, N. Y.

HEHTEMND—See Fairley Davidson Steel Co.

HELMUTH, Co., L., 17 Battery Pl., New York, N. Y. (Importers.)

ILLINOIS Steel Co., 203 S. La Salle St., Chicago, Ill.

KREFELD Steel Co., 50 Church St., New York, N. Y. (Importers.)

KRUPP—See Prosser & Son.

LINDENBERG Steel Co., 90 West St., New York, N. Y. (Importers.)

MIDVALE Steel Co. (Nicetown), Philadelphia, Pa.

NICO—See Carbon Steel Co.

PHILADELPHIA Steel & Forge Co., 50 Church St., New York, N. Y.

POLDI—See Frasse & Co.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp." (See page 387.)

UNION Drawn Steel Co., Beaver Falls, Pa. (See page 475.)

UNITED Steel Co., Canton, O. (See page 497.)

VULCAN Crucible Steel Co., First St., Aliquippa, Pa.

CHROME NICKEL STEEL

AMERICAN Import & Export Co., 150 Nassau St., New York, N. Y. (Importers.)

ARBO—See Carbon Steel Co.

ARROW—See Crowley Co.

BALDWIN Steel Co., Charleston, W. Va.

BECKER Steel Co. of America, 90 West St., New York, N. Y. (Importers.)

BISCHOFF—See Elliott, H. A.

CARBON Steel Co., ft. 32d St., Pittsburg, Pa. "Arbo," "Decco," "Shrapo."

CARPENTER Steel Co., Reading, Pa.

CROWLEY Co., John A., 120-22 Liberty St., New York, N. Y. "Arrow." (See page 405.)

CRUCIBLE Steel Co. of America, Oliver Bldg., Pittsburg, Pa. "Simplex," "Duplex."

DECCO—See Carbon Steel Co.

DUPLEX—See Crucible Steel Co. of America.

ELLIOTT, H. A., Majestic Bldg., Detroit, Mich. (Importer.) "Bischoff."

FAIRLEY DAVIDSON Steel Co., 124 Maiden Lane, New York, N. Y. (Importers.) "Hehtemnd." (See page 393.)

FARIST Steel Co., 137 E. Main St., Bridgeport, Conn.

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NATURAL ALLOY. NICKEL-CHROME.

Manufactured From Cuban Ore

Crank-Shafts; Transmission, Drive and Jack Shafts; I-Beam, Tubular and Driving Axles; Connecting Rods; Transmission and Differential Gears, Case Hardened, Water or Oil Hardened; Frames; High Tension Bolts; Steering Knuckles; Springs; Miscellaneous Forgings to be Heat-Treated

In the untreated condition this steel may be forged, rolled or machined the same as carbon steel; experience in special steels is not essential. After heat-treatment will show from 50,000 to over 200,000 pounds per square inch Elastic Limit, according to grade and treatment. An excellent base for VANADIUM additions, superior to chrome-vanadium steel.
Supplied in round or square bars, flats; billets; forging blooms, concave spring flats. Rolled, smooth forged, cold drawn or turned bars.

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Concave Flats and Standard Rounds.

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CHROME NICKEL STEEL (Continued)

FOX & Co., Samuel, 44 Cliff St., New York, N. Y. (Importers.)
(See page 405.)

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. (Importers.) "Poldi."
(See page 425.)

HALCOMB Steel Co., Syracuse, N. Y.

HELLER Bros. Co., Newark, N. J.

HEHTEMND—See Fairley Davidson Steel Co.

ILLINGSWORTH Steel Co., John (Frankford), Philadelphia, Pa.

ILLINOIS Steel Co., 203 S. La Salle St., Chicago, Ill.

KREFELD Steel Co., 50 Church St., New York, N. Y. (Importers.)

KRUPP—See Prosser & Son.

LINDENBERG Steel Co., 90 West St., New York, N. Y. (Importers.)

McINNES Steel Co., Corey, Pa.

MAYARI—See Pennsylvania Steel Co.

MIDVALE Steel Co. (Nicetown), Philadelphia, Pa.

PENNSYLVANIA Steel Co., Morris Bldg., Philadelphia, Pa. "Mayari."
(See page 389.)

PHILADELPHIA Steel & Forge Co., 50 Church St., New York, N. Y.

POLDI—See Frasse & Co.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp."
(See page 387.)

ROECHLING Electro Steel Co., 173-77 Lafayette St., New York, N. Y. (Importers.)

SHRAPO—See Carbon Steel Co.

SIMPLEX—See Crucible Steel Co. of America.

TUSCO—See United Steel Co.

UNION Drawn Steel Co., Beaver Falls, Pa.
(See page 475.)

UNITED Steel Co., Canton, O. "Tusco."
(See page 497.)

VULCAN Crucible Steel Co., First St., Aliquippa, Pa.

VANADIUM STEEL

ALLEN & Co., Edgar, 718 W. Lake St., Chi-Ill. (Importers.)

ALVA—See Crucible Steel Co. of America.

BALDWIN Steel Co., Charleston, W. Va.

CARNEGIE Steel Co., Carnegie Bldg., Pittsburg, Pa.

CARPENTER Steel Co., Reading, Pa.

CRUCIBLE Steel Co. of America, Oliver Bldg., Pittsburg, Pa. "Alva."

FAIRLEY DAVIDSON Steel Co., 124 Maiden Lane, New York, N. Y. (Importers.) "Hehtemnd."
(See page 393.)

FITZSIMONS Co., Youngstown, O.

HALCOMB Steel Co., Syracuse, N. Y.

HARROW Spring Co., Colby-Abbot Bldg., Milwaukee, Wis.

HEHTEMND—See Fairley Davidson Steel Co.

KREFELD Steel Co., 50 Church St., New York, N. Y. (Importers.)

KRUPP—See Prosser & Son.

McINNES Steel Co., Corry, Pa.

MIDVALE Steel Co. (Nicetown), Philadelphia, Pa.

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp."
(See page 387.)

UNION Drawn Steel Co., Beaver Falls, Pa.
(See page 475.)

UNITED Steel Co., Canton, O.
(See page 497.)

VANADIUM-ALLOYS Steel Co., Latrobe, Pa. "Vasco."

VASCO—See Vanadium-Alloys Steel Co.

VULCAN Crucible Steel Co., First St., Ali-

ALUMINUM COATED SHEET STEEL

ALUMALOYD Products Co., Canton, O.

HIGH-SPEED CUTTING STEEL

ALBION—See Hobson, Houghton & Co.

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ANDREW & Co., J. H., 107 West St., New York, N. Y. (Importers.) "Toledo."

ARK—See Jessop & Sons.

ARROW—See Crowley Co.

ATLAS Crucible Steel Co., 66 Howard Ave., Dunkirk, N. Y. "Loco."

BALDWIN Steel Co., Charleston, W. Va. "Hudson."

BOHLERS—See Houghton & Richards.

BRAEBURN Steel Co., Braeburn, Pa.

BURGESS—See Cyclops Steel Works.

CAPITAL—See Nash Co.

CARDINAL—See Elliott, H. A.

CARPENTER Steel Co., Reading, Pa. "Star Zenith."

COLONIAL Steel Co., Keystone Bldg., Pittsburg, Pa.

COLUMBIA Tool Steel Co., Chicago Heights, Ill.

CROWLEY Co., John A., 120-22 Liberty St., New York, N. Y. "Arrow."
(See page 405.)

CRUCIBLE Steel Co. of America, Oliver Bldg., Pittsburg, Pa. "Rex."

CYCLOPS Steel Works, 265 E. Spring St., Titusville, Pa. "Burgess."

DREADNOUGHT—See Halcomb Steel Co.

ELLIOTT, H. A., Majestic Bldg., Detroit, Mich. (Importer.) "Cardinal."

FAIRLEY DAVIDSON Steel Co., 124 Maiden Lane, New York, N. Y. (Importers.) "Xtof," "Rushitoff."
(See page 393.)

FOX & Co., Samuel, 44 Cliff St., New York, N. Y. (Importers.)
(See page 405.)

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Best Carbon Tool Steel

Annealed and Unannealed

For DIES and High-Grade TOOLS

Best Carbon Sheet Steel

For Saws, Knives, Etc., Etc.

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STEEL (Continued)

HIGH-SPEED CUTTING STEEL (Continued)

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. (Importers.) "Poldi." (See page 425.)

HALCOMB Steel Co., Syracuse, N. Y. "Dreadnought."

HELLER Bros. Co., Newark, N. J.

HOBSON, Houghton & Co., 83 Beekman St., New York, N. Y. (Importers.) "Albion."

HOUGHTON & Richards, 145 Oliver St., Boston, Mass. "Bohlers."

HUDSON—See Baldwin Steel Co.

IMPROVED CAPITAL—See Ward's Sons.

JESSOP & Sons, Wm., 91 John St., New York, N. Y. (Importers.) "Ark." (See page 391.)

JONES & Co., B. M., 141 Milk St., Boston, Mass. (Importers.) "Mushet."

KREFELD Steel Co., 50 Church St., New York, N. Y. (Importers.)

LINDENBERG Steel Co., 90 West St., New York, N. Y. (Importers.)

LOCO—See Atlas Crucible Steel Co.

LUDLUM Steel Co., Watervliet, N. Y. "Mohawk," "Seneca."

McINNES Steel Co., Corry, Pa.

MIDVALE Steel Co. (Nicetown), Philadelphia, Pa.

MOHAWK—See Ludlum Steel Co.

MUSHET—See Jones & Co.

NASH Co., Geo., 217 Pearl St., New York, N. Y. (Importers.) "Capital." (See page 433.)

POLDI—See Frasse & Co.

RED CUT SUPERIOR—See Vanadium-Alloys Steel Co.

REX—See Crucible Steel Co. of America.

ROECHLING Electro Steel Co., 173-77 Lafayette St., New York, N. Y. (Importers.)

RUSHITOFF—See Fairley Davidson Steel Co.

SENECA—See Ludlum Steel Co.

STAR ZENITH—See Carpenter Steel Co.

TOLEDO—See Andrew & Co.

VANADIUM-ALLOYS Steel Co., Latrobe, Pa. "Red Cut Superior."

VULCAN Crucible Steel Co., First St., Aliquippa, Pa.

WARD'S Sons, Edgar T., 25 Purchase St., Boston, Mass. (Importers.) "Improved Capital." (See page 433.)

XTOF—See Fairley Davidson Steel Co.

SELF-HARDENING CUTTING STEEL

AJAX—See Baldwin Steel Co.

ALLEN & Co., Edgar, 718 W. Lake St., Chicago, Ill. (Importers.)

BALDWIN Steel Co., Charleston, W. Va. "Ajax."

BLUE CHIP—See Firth-Sterling Steel Co.

FIRTH-STERLING Steel Co., McKeesport, Pa. "Blue Chip."

HALCOMB Steel Co., Syracuse, N. Y.

HOBSON, Houghton & Co., 83 Beekman St., New York, N. Y. (Importers.) "Soho."

ILLINGSWORTH Steel Co., John (Frankford), Philadelphia, Pa.

JESSOP & Sons, Wm., 91 John St., New York, N. Y. (Importers.) (See page 391.)

JONES & Co., B. M., 141 Milk St., Boston, Mass. (Importers.) "Mushet."

MUSHET—See Jones & Co.

SOHO—See Hobson, Houghton & Co.

VULCAN Crucible Steel Co., First St., Aliquippa, Pa.

STEPS

FORGED STEPS

(See Forgings, Drop)

SPECIAL STEPS AND RUNNING BOARDS

BOSSERT Co., Utica, N. Y. (See page 223.)

BUFFALO Pressed Steel Co., Military Rd. & Lansing St., Buffalo, N. Y.

DETROIT Pressed Steel Co., 1800 Mt. Elliott Ave., Detroit, Mich. (See page 555.)

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

ERDLE Perforating Co., 7 Factory St., Rochester, N. Y.

FORSYTH Bros. Co., Harvey, Ill.

HAYES Mfg. Co., Detroit, Mich. "Hayes-Stanwood."

HAYES-STANWOOD—See Hayes Mfg. Co.

HYDRAULIC Pressed Steel Co., 3164 E. 61st St., Cleveland, O. (See page 289.)

KINSEY Mfg. Co., Toledo, O.

MICHIGAN Stamping Co., 759-71 Bellevue Ave., Detroit, Mich.

MOLINE Pressed Steel Co., East Moline, Ill.

MOTOR Parts Co., Plainfield, N. J. "Stanwood."

PARISH & Bingham Co., Cleveland, O. (See page 173.)

STANWOOD—See Motor Parts Co.

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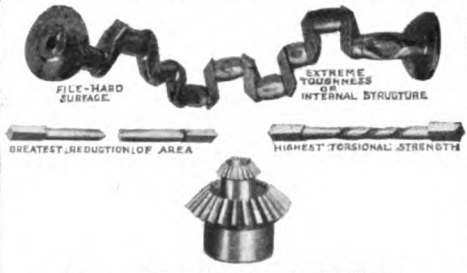

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Its machining qualities are **amazing** as with ordinary high speed steel it will machine at **120 ft. per minute.**

In heat treating it will **not distort.**

Our N. Y. Stocks consist of rounds from ½ to 12″ also billets

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↓HIGHEST ↓ELASTICITY ↓HIGHEST ↓TENACITY ↓EASIEST ↓MACHINING ↓NO ↓DISTORTION

HEHTEMND

REGISTERED

Physical Qualities
(Approx.)

	Annealed	*Treated*
Tensile Strength	120000	200000
Elastic Limit	98000	152000
Elongation	25%	18%
Reduction of Area	50%	42%
Sclerescopic reading—	25 Soft Annealed	83 Hard Treated

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(For cleaning platinum points on Spark Coils)

PIKE Mfg. Co., Pike, N. H.

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GASOLINE STRAINERS OR SEPARATORS

(For use between tank and carbureter to remove dirt and water. For Strainer Funnels—See Funnels, Gasoline)

ALLEN Wrench & Tool Co., Public & Eddy Sts., Providence, R. I.

AMERICAN Brass & Iron Co., Detroit, Mich.
(See page 211.)

ATKINS Carburetor Co., Dwight, Ill.

ATTWOOD Brass Works, Scribner Ave. & Bowery St., Grand Rapids, Mich.
(See page 249.)

BINGHAM Mfg. Co., 227 Prospect Ave., N. W., Cleveland, O. "Shurecleen."

BOUSMAN Mfg. Co., 1126 Plainfield Ave., Grand Rapids, Mich. "Grand Rapids."

BREEZE Carbureter Co., 250-52 South St., Newark, N. J.

BUSH Mfg. Co., Hartford, Conn.
(See page 207.)

CRUM-WILEY Mfg. Co., Peru, Ind.

DAVIDSON—See Wallace Supply Co.

ELLIS—See National Sales Co.

EMMONS Specialty Co., 241 E. Jefferson Ave., Detroit, Mich. "Esco."

ESCO—See Emmons Specialty Co.

FINDEISEN & Kropf Mfg. Co., 2125 Rockwell St., Chicago, Ill. "Rayfield."
(See page 93.)

G. & A. Carburetor Co., 450-52 Sixth Ave., New York, N. Y.

GLEASON-PETERS Air Pump Co., 255-61 Classon Ave., Brooklyn, N. Y.

GRAND RAPIDS—See Bousman Mfg. Co.

GRAY-HAWLEY Mfg. Co., 937-43 Jefferson Ave., Detroit, Mich.

HALLADAY Co., L. P., Dept. A., Streator, Ill.
(See page 359.)

HANCOCK Mfg. Co., 770 Henry St., Charlotte, Mich.

HANS Motor Equipment Co., La Crosse, Wis.

HARWOOD, C. F., 516 Atlantic Ave., Boston, Mass.

IDEAL Brass Works, Tenth & Canal Sts., Indianapolis, Ind.

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O. "Trusty."

McRAE & Roberts Co., 211-35 Campbell Ave., Detroit, Mich.

MICHIGAN Lubricator Co., 661-73 Beaubien St., Detroit, Mich.

MOSLER & Co., A. R., Box M, Mt. Vernon, N. Y.
(See page 303.)

NATIONAL Sales Co., 45 Milk St., Boston, Mass. "Ellis."

OATHOUT, Chas. M., Saugerties, N. Y.

POWELL Co., Wm., 2521-31 Spring Grove Ave., Cincinnati, O.

R-M—See Randall-Miller Co.

RANDALL-MILLER Co., 93 Massachusetts Ave., Boston, Mass. "R-M."

RAYFIELD—See Findeisen & Kropf Mfg. Co.

REYNOLDS, George T., 341-49 Eddy St., Providence, R. I.

SHURECLEEN—See Bingham Mfg. Co.

STOTT-CROWLEY Mfg. Co., 1042 Grand River Ave., Detroit, Mich.

STROMBERG Motor Devices Co., 64-68 E. 25th St., Chicago, Ill.

TRUSTY—See Lunkenheimer Co.

WALLACE Supply Co., 412-20 Orleans St., Chicago, Ill. "Davidson."

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chi-
(See page 293.)

WHEELER & Schebler, Indianapolis, Ind.
(See page 509.)

ZERK Mfg. Co., Cleveland, O.

STRAPS

ANTI-RATTLING HOOD STRAPS

CAMPBELL—See Perkins Campbell Co.

HOOVER Co., W. H., New Berlin, O.

PERKINS Campbell Co., 634 Broadway, Cincinnati, O. "Campbell."
(See page 48.)

WINSHIP, W. W., 71 Summer St., Boston, Mass.

LEATHER STRAPS

AJAX Trunk & Sample Case Co., 91-93 Mercer St., New York, N. Y.

ARMSTRONG & Graham, 128-32 Jefferson Ave., Detroit, Mich.

B. E. Mfg. Co., 444 Broadway, New York, N. Y.
(See page 97.)

BACKSTAY Machine & Leather Co., Union City, Ind.

BAILEY Co., R. B., 406 W. Pico St., Los Angeles, Cal.

BAUER-LEWIS Co., 363 Holden Ave., Detroit, Mich.

BRACE Leather Goods Co., 22 Wayne St., Pontiac, Mich.

BUNGE, Otto, 1052 Dawson St., Indianapolis, Ind.

CAMPBELL—See Perkins Campbell Co.

CARTER Co., George R., 1600-20 Kentucky Ave., Connersville, Ind.

DECKER, J. C., Montgomery, Pa.

DESOCO—See Detroit Socket Co.

DETROIT Leather Works, 141-43 E. Lafayette Blvd., Detroit, Mich.
(See page 75.)

DETROIT Socket Co., 814 Jefferson Ave., W., Detroit, Mich. "Desoco."

DUCKWALL Belting & Hose Co., 516 Capitol Blvd., Indianapolis, Ind.

ECONOMY Stay Co., Jefferson City, Mo.

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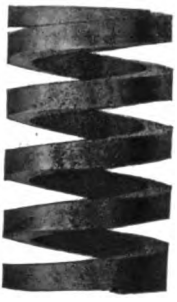

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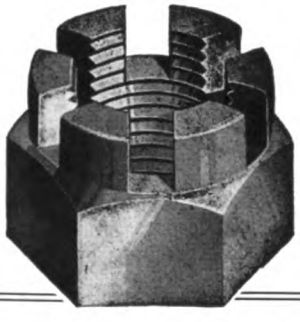

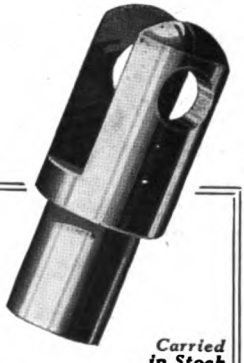

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G & K—See Graton & Knight Mfg. Co.

GRATON & Knight Mfg. Co., Worcester, Mass. "G & K."
(See page 65.)

HAGER & Son, Chas., 244-46 E. 52d St., New York, N. Y.

HANISCH Sons, R., 123-27 N. Halsted St., Chicago, Ill.

HOLLIDAY & Wyon Co., West & Ohio Sts., Indianapolis, Ind.

HOOVER Co., W. H., New Berlin, O.

JEWELL Belting Co., 15 Trumbull St., Hartford, Conn.

KELLEY, A. F., 178 S. Main St., Providence, R. I.

KOPF-ENGEL Co., 49 Warren St., New York, N. Y.

KRONAUER & Co., Chas., 152 N. Desplaines St., Chicago, Ill.

LEATHER Products Co., 2268 Spring Grove Ave., Cincinnati, O.

NATHAN Novelty Mfg. Co., 90 G. Reade St., New York, N. Y.
(See page 209.)

NATIONAL Leather Mfg. Co., Niles, Mich.

PERKINS Campbell Co., 634 Broadway, Cincinnati, O. "Campbell."
(See page 48.)

REINHOLD Belting & Supply Co., 499 Atlantic Ave., Brooklyn, N. Y.

RHOADS & Sons, J. E., 12 N. Third St., Philadelphia, Pa.

SMITH & Son, James, 40-42 Franklin Ave., Brooklyn, N. Y.

SPECIALTY Harness Co., Dayton, Va.

SPRINGFIELD Harness Co., 55-61 Dwight St., Springfield, Mass.

STEVENS & Bro., A. A., 1234 Wabash Ave., Chicago, Ill.

STRECKER Bros. Co., 117-19 Putnam St., Marietta, O.

SUPERIOR—See Feeser Co.

SUTHERLAND Co., F. L., 139 Beaubien St., Detroit, Mich.
(See page 449.)

WAKEFIELD Sales Co., Trempealeau, Wis.

WARREN Leather Goods Co., 80 Austin St., Worcester, Mass.

WING Co., Charles, Amesbury, Mass.
(See page 399.)

REBOUND STRAPS

(See also Shock Absorbers; also Springs, Supplementary)

BAUER-LEWIS Co., 363 Holden Ave., Detroit, Mich.

BOWLING GREEN—See Sunvold & Parson Mfg. Co.

BRACE Leather Goods Co., 22 Wayne St., Pontiac, Mich.

BUCKEYE—See Central Brass & Fixture Co.

BUNGE, Otto, 1052 Dawson St., Indianapolis, Ind.

CARTER Co., George R., 1600-20 Kentucky Ave., Connersville, Ind.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O. "Buckeye."

DETROIT Leather Works, 141-43 E. Lafayette Blvd., Detroit, Mich.
(See page 75.)

FEESER Co., Frank S., 1102 Prospect St., Indianapolis, Ind. "Superior."

G & K—See Graton & Knight Mfg. Co.

GILMER Co., L. H., 52 N. Seventh St., Philadelphia, Pa.
(See page 397.)

GRATON & Knight Mfg. Co., Worcester, Mass. "G & K."
(See page 65.)

HOOVER Co., W. H., New Berlin, O.

McGREGOR—See U. S. Auto Bumper Co.

MESINGER Mfg. Co., H. & F., Austin Pl. & E. 144th St., New York, N. Y.

MITCHELL—See Motor Specialties Co.

MOTOR Specialties Co., Waltham, Mass. "Mitchell."

PERKINS Campbell Co., 634 Broadway, Cincinnati, O.
(See page 48.)

SIERRA—See Sturges Co.

STURGES Co., V. K., 239-12th St., Oakland, Cal. "Sierra."

SUNVOLD & Larson Mfg. Co., Sacred Heart, Minn. "Bowling Green."

SUPERIOR—See Feeser Co.

U. S. Auto Bumper Co., 20 E. 20th St., Chicago, Ill. "McGregor."

STARTING CRANK STRAPS

(See Holders, Starting Crank)

WEB STRAPS

BUFFALO Weaving & Belting Co., 234 Chandler St., Buffalo, N. Y.

STRIPS

SPRING LEAF LUBRICATING STRIPS

DANN Oil-Cushion Spring Insert Co., 2246 Indiana Ave., Chicago, Ill.

RIDEOVER—See Wadhams Oil Co.

WADHAMS Oil Co., Milwaukee, Wis. "Rideover."

SUPPLIES

DEALERS IN SUPPLIES

(This is a list of Dealers and Jobbers in Automobile Supplies who advertise in this publication)

POST & Lester Co., 112 Allyn St., Hartford, Conn.
(See page 495.)

PRUDEN Hardware Co., W. E., 864-66 Eighth Ave., New York, N. Y.
(See page 467.)

ZINKE Co., 1326 Michigan Ave., Chicago, Ill.
(See page 365.)

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Any set of Springs will take care of the Shock, but they can't prevent the Rebound

Gilmer Rebound Straps

Do that and Protect your Springs

The first shock never broke a good spring, but the smashing back kick does. GILMER REBOUND STRAPS do not retard spring action on smooth roads, but come into play immediately at rough spots, preventing Spring strain and breakage, and absorbing the shock, so that they add very materially to the easy riding qualities of any car.

Adopted as regular equipment on most of the good cars, and exclusive for 1913 on Cadillac, Hudson, Premier, Herreshoff, Hupmobile.

We make different types for different cars and can fill any requirements for any weight cars or any spring suspension.

GILMER WOVEN ENDLESS FAN BELTS

They do not stretch and are water and oil proof. They grip the pulley tighter than leather, and keep the fan on the job. Supplied exclusively by the ten largest Motor makers and most of the good car Manufacturers.

For FORD Owners and dealers, we have a special belt that will do away with all your FAN BELT trouble.

GILMER ANTI-SQUEAK

The original body lining. The one lining that will last as long as the car and prevent body noises during its entire life. Now used by fifty-four leading Car Manufacturers.

SAMPLES AND PRICES ON ANY OF ABOVE ITEMS UPON APPLICATION

Cadillac Type, Single Pin, Tested to 6,000 Pounds. Also made for Double Pin Construction

L. H. GILMER CO.

52 North Seventh Street, Philadelphia, Pa.

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SUPPORTS

HOOD SUPPORTS OR ARCH BARS

CROSBY Co., Buffalo, N. Y.
(See page 157.)

KINSEY Mfg. Co., Toledo, O.

KONIGSLOW Mfg. Co., Otto, E. 35th St. & Perkins Ave., Cleveland, O.

METAL Specialty Co., Cincinnati, O.

MOLINE Pressed Steel Co., East Moline, Ill.

SWITCHES

AUTOMATIC CUT-OUT SWITCHES

(For cutting out lights automatically when motor is not running)

PRICE Electric & Mfg. Co., Basic City, Va.

AUTOMATIC TIME SWITCHES

(For automatically turning the current on or off when charging storage batteries)

CAMPBELL Electric Co., Lynn, Mass.

CRESCENT—See McGill Mfg. Co.

DORLAND, Leslie C., 102 Montgomery St., Poughkeepsie, N. Y.

GENERAL Electric Co., Schenectady, N. Y.

McGILL Mfg. Co., 34 Oak St., Valparaiso, Ind. "Crescent."

SORENSON, P., 18 Dunham Pl., Brooklyn, N. Y.

WESTINGHOUSE Electric & Mfg. Co. (E. Pittsburg), Pittsburg, Pa.

ELECTRIC STARTER SWITCHES

(See also Starters, Electric)

H & H—See Hart & Hegeman Mfg. Co.

HART & Hegeman Mfg. Co., 342 Capitol Ave., Hartford, Conn. "H & H."

HARTMAN Electrical Mfg. Co., Mansfield, O.

FOOT SWITCHES

HERZ & Co., 245 W. 55th St., New York, N. Y.
(See page 311.)

IGNITION SWITCHES

AMPCO—See S-M Novelty Mfg. Co.

ATWATER Kent Mfg. Works, 4937 Stenton Ave., Philadelphia, Pa.

BRIGGS & Stratton Co., 275 Milwaukee St., Milwaukee, Wis.

CHICAGO Electric Mfg. Co., 2817 S. Halsted St., Chicago, Ill. "Handy."

CLUM Mfg. Co., Montgomery Bldg., Milwaukee, Wis.

CONNECTICUT Telephone & Electric Co., Meriden, Conn.
(See page 401.)

COUCH CO., S. H., 170 Purchase St., Boston, Mass. "Puritan."

DOW Mfg. Co., 131 Adams St., Braintree, Mass.

FAHNESTOCK Electric Co., 129 Patchen Ave., Brooklyn, N. Y.

FAULTLESS—See Motsinger Device Mfg. Co.

HANDY—See Chicago Electric Mfg. Co.

IDEAL Switch Co., Plainville, Conn.

KINGSTON—See Kokomo Electric Co.

KNOBLOCK-HEIDEMAN Mfg. Co., Sample St. & Vistula Ave., South Bend, Ind. "Quick Action."

KOKOMO Electric Co., 1415 Webster St., Kokomo, Ind. "Kingston."

MORSE, Frank W., 516 Atlantic Ave., Boston, Mass.

MOTSINGER Device Mfg. Co., Lafayette, Ind. "Faultless."

NEW YORK Coil Co., 338-40 Pearl St., New York, N. Y.

PERFEX—See Samson Electric Co.

PITTSFIELD Spark Coil Co., Dalton, Mass.
(See page 127.)

PURITAN—See Couch Co.

QUICK ACTION—See Knoblock-Heideman Mfg. Co.

ROSCO—See Rosen & Co.

ROSEN & Co., A. W., 610-14 Broadway, New York, N. Y. "Rosco."
(See page 139.)

S-M Novelty Mfg. Co., 52d St. & Baltimore Ave., Philadelphia, Pa. "Ampco."

SAMSON Electric Co., Canton, Mass. "Perfex."

SPLITDORF Electrical Co, Newark, N. J.
(See page 161.)

WELLS Mfg. Co., R. C., Fond du Lac, Wis.

WICO—See Witherbee Igniter Co.

WILLIAMS, E. Q., 535-39 S. Clinton St., Syracuse, N. Y.

WITHERBEE Igniter Co., Springfield, Mass. "Wico."

KICK SWITCHES

(See Switches, Ignition)

LIGHT SWITCHES

(For turning on and off electric lights on car)

ADAMS-BAGNALL Electric Co., Cleveland, O.

BRIGGS & Stratton Co., 275 Milwaukee St., Milwaukee, Wis.

CHICAGO Electric Mfg. Co., 2817 S. Halsted St., Chicago, Ill. "Handy."

CLUM Mfg. Co., Montgomery Bldg., Milwaukee, Wis.

CONNECTICUT Telephone & Electric Co., Meriden, Conn.
(See page 401.)

COWLES & Co., C., New Haven, Conn.
(See page 87.)

CULVER-STEARNS Mfg. Co., Worcester, Mass.
(See page 139.)

CUNO Engineering Corp., 80 S. Vine St., Meriden, Conn.

Complete Index to Classification appears on Pages 8 to 26.

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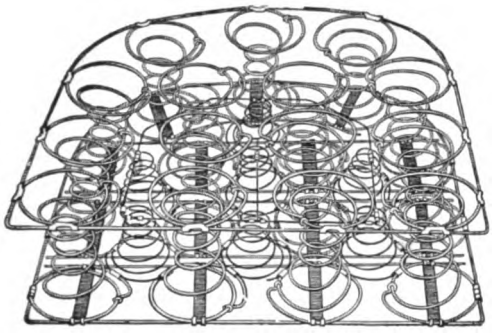
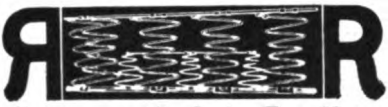


ROUGH RIDER SPRINGS (Patented)



Best Automobile Spring Ever Made

No Possible Bumps or Jars **See these Auxiliary Springs?**

The Best Cushions are made with

ROUGH RIDER SPRINGS

NOTHING SO COMFORTABLE

No Shocks or Jars when Rough Riders are used

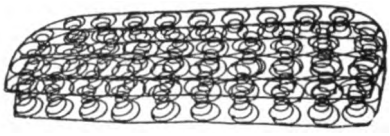
Manufactured by

JACKSON CUSHION SPRING CO., Jackson, Mich.

RANDOLPH EDWARDS CO. Exclusive Selling Agents

THE WING PATTERN CUSHION SPRING

shown below is used by all the leading manufacturers of Automobiles in the East and has stood the test of ten years' service with satisfaction alike to makers of Cars as well as users.



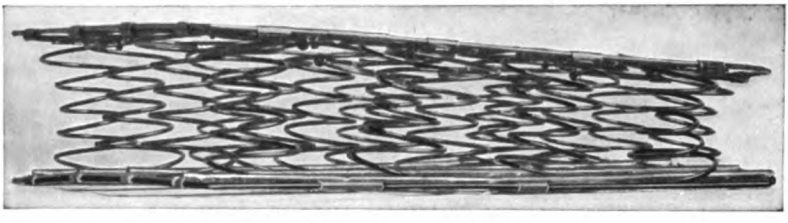
Cushion Spring (Wing Pattern) for Auto Seats

Manufactured by

THE CHARLES WING CO.

Amesbury, Mass., U. S. A.

Manufacturers of Auto Top Straps and Straps and Trimmings of many varieties, also wholesale dealers in all classes of Automobile Upholstering Leather and other materials.



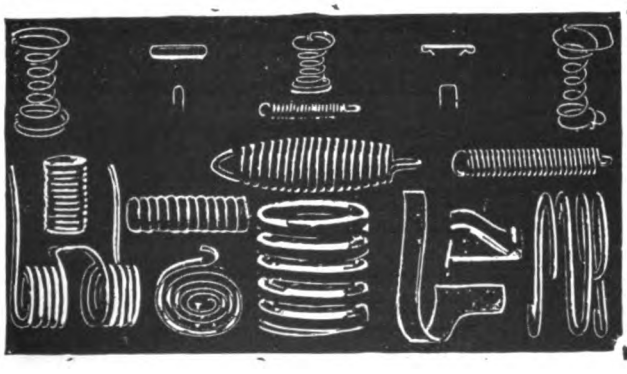
Comfort & Durability

The two great essentials in a Cushion Spring

The Royal Arch Auxiliary Cushion Spring

is a revelation in Comfort and Durability. Bears investigation. Prices and samples sent on request.

DETROIT WIRE SPRING COMPANY, Detroit, Michigan



The Wm. D. Gibson Co.

Huron & Kingsbury Sts., Chicago

SPRINGS

SPIRAL and FLAT

Steel Brass and Phosphor Bronze

Special Shapes and Sizes to meet all requirements of Automobile Makers.

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SWITCHES (Continued)

LIGHT SWITCHES (Continued)

CUTLER Hammer Mfg. Co., Milwaukee, Wis.
(See page 191.)

DIAMOND H—See Hart Mfg. Co.

GENERAL Electric Co., Schenectady, N. Y.

H & H—See Hart & Hegeman Mfg. Co.

HANDY—See Chicago Electric Mfg. Co.

HART Mfg. Co., Hartford, Conn. "Diamond H."

HART & Hegeman Mfg. Co., 342 Capitol Ave., Hartford, Conn. "H & H."

HARTMAN Electrical Mfg. Co., Mansfield, O.

IDEAL Switch Co., Plainville, Conn.

L-N—See Leece-Neville Co.

LEECE-NEVILLE Co., 2069 E. Fourth St., Cleveland, O. "L-N."

MORSE, Frank W., 516 Atlantic Ave., Boston, Mass.

NORTH East Electric Co., Rochester, N. Y.
(See page 531.)

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y.
(See page 87.)

ROSCO—See Rosen & Co.

ROSEN & Co., A. W., 610-14 Broadway, New York, N. Y. "Rosco."
(See page 139.)

WESTINGHOUSE Electric & Mfg. Co., (E. Pittsburg), Pittsburg, Pa.

WICO—See Witherbee Igniter Co.

WITHERBEE Igniter Co., Springfield, Mass. "Wico."

LOCK SWITCHES

(Ignition switches equipped with lock to prevent unauthorized use of car)

AMPER Electric Co., 453 Willow St., Lockport, N. Y.

AUTOMOBILE Combination Lock Co., St. Louis, Mo.

BLACKBURN Specialty Co., 3405-09 Perkins Ave., Cleveland, O. "Blaco."

BLACO—See Blackburn Specialty Co.

CONNECTICUT Telephone & Electric Co., Meriden, Conn.
(See page 401.)

DELTA-STAR Electric Co., 617-31 W. Jackson Blvd., Chicago, Ill.

ESCO Mfg. Co., 1580 Woodward Ave., Detroit, Mich.

EVERETT Mfg. Co., 162-64 N. May St., Chicago, Ill.

FACTORY Sales Co., Cleveland, O.

H. P. B. Electric Co., 500 Fifth Ave., New York, N. Y.

LAWRENCE Specialty Co., Boston, Mass.

PERKINS Auto Thief Alarm & Lock Co., 228 Broadway, Detroit, Mich.

SAFETY Device Co., 372 S. Illinois St., Indianapolis, Ind.

SLY Mfg. Co., W. W., Cleveland, O.

STEERING WHEEL SWITCHES

(Ignition Switches for attachment to Steering Wheel)

CONNECTICUT Telephone & Electric Co., Meriden, Conn.
(See page 401.)

SYSTEMS

ELECTRIC LIGHTING SYSTEMS

(See also Dynamos, Electric Lighting)

ADAMS-BAGNALL Electric Co., Cleveland, O.

ADAMS & Westlake Co., Chicago, Ill. "Adlake."
(See page 153.)

ADLAKE—See Adams & Westlake Co.

APPLE Electric Co., Newark, N. J.

DAYTON Engineering Laboratories Co., Dayton, O. "Delco."

DELCO—See Dayton Engineering Laboratories Co.

DISCO Electric Starter Co., Detroit, Mich.
(See page 647.)

DYNETO Electric Co., Syracuse, N. Y.
(See page 259.)

ECONOMY Electric Co., Economy, Pa.

ELECTRIC Auto-Lite Co., Toledo, O. "Fisher."
(See page 381.)

ESTERLINE Co., 228 E. South St., Indianapolis, Ind.

FISHER—See Electric Auto-Lite Co.

FISHER Electrical Works, 2000 Larned St., W., Detroit, Mich.

HOLTZER-CABOT Electric Co., Brookline, Mass.

JESCO—See Jones Electric Starter Co.

JONES Electric Starter Co., 1401 W. Jackson Blvd., Chicago, Ill. "Jesco."

L-N—See Leece-Neville Co.

LEECE-NEVILLE Co., 2069 E. Fourth St., Cleveland, O. "L-N."

LEONARD Electric Co., Ward, Bronxville, N. Y.

NORTH East Electric Co., Rochester, N. Y.
(See page 531.)

SAMSON Engineering Co., Louisville, Ky.

U-S-L—See U. S. Light & Heating Co.

U. S. Light & Heating Co., Niagara Falls, N. Y. "U. S. L."
(See page 385.)

VESTA Accumulator Co., 2100 Indiana Ave., Chicago, Ill.

WESTINGHOUSE Electric & Mfg. Co., (E. Pittsburg), Pittsburg, Pa.

SINGLE SPARK IGNITION SYSTEMS

ATWATER Kent Mfg. Works, 4937 Stenton Ave., Philadelphia, Pa. "Unisparker."

CONNECTICUT Telephone & Electric Co., Meriden, Conn.
(See page 401.)

NEW YORK Coil Co., 338-40 Pearl St., New York, N. Y. "Rhoades."

RHOADES—See New York Coil Co.

SEVISON Electric Co., Elkhart, Ind.

UNISPARKER — See Atwater Kent Mfg. Works.

Complete Index to Classification appears on Pages 8 to 26.

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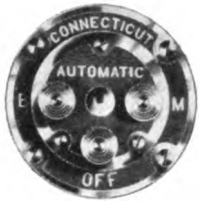
CONNECTICUT
AUTOMATIC IGNITION



Automatic Switch

The Connecticut Automatic Switch is a thermostatically actuated mechanism that will automatically kick off and break the circuit in case the operator neglects to turn off his switch, as is so frequently the case.

Igniter.

The igniter is supported on two ball bearings and arranged to mount on a half time vertical shaft. Its greatest diameter is only 2½ inches in the four-cylinder and 2¾ inches in the six, and its extreme height is 4¾ inches.

Type "G" Coil.

The coil is heat proof and of a high dielectric material unassailable by any conditions to which it may be subjected, and may be mounted any place on the motor.

This system is the most modern form of ignition and is a development from and an improvement on the magneto. As progress now demands an electric generator on every car for lighting purposes, the magneto mechanism less its current generating unit has been utilized with the added advantage of a constant source of current in the storage battery, so that an equally efficient spark may be produced at low speeds as at high speeds. On the other hand, with a magneto an effectual spark could only be produced at high speeds.

In its simplicity of construction it has been possible to avoid many of the complications and mechanical difficulties which have previously prevented less modern forms of ignition, including the magneto, from being absolutely synchronous on all occasions, and we have further succeeded in eliminating the electrical and mechanical lag so disastrous to the development of power.

In accomplishing the above and in insuring an efficient spark at all speeds, it has been necessary to allow the coil a prolonged period of saturation. While this is a well-known principle, most devices have been restrained from taking advantage of this inasmuch as it would be disastrous to the life of the storage battery should the outfit be inadvertently left with the switch on and the current allowed to flow continuously.

Prices.

Type "E" System—(having switch and coil combined).			
2 and 3-cyl.	4-cyl.	6-cyl.	8-cyl.
$34.00	$35.00	$36.00	$38.00
Type "G" System—(having switch and coil separate)..			
2 and 3-cyl.	4-cyl.	6-cyl.	8-cyl.
$34.00	$35.00	$36.00	$38.00

When ordering, be sure to state direction of rotation of igniter, as viewed from top facing end of driving shaft to which igniter is to be fitted.

For mounting this igniter in place of a magneto we supply bases with vertical half time shaft.

Magneto Base, list.....$5.00

CONNECTICUT
MASTER VIBRATOR

FOR FORD CARS

The Connecticut Master Vibrator is a specially designed instrument to furnish efficient and accurately timed ignition for Ford Model T cars fitted with fly-wheel magnetos.

It is the smallest and most compact instrument of its kind on the market, and is the only master vibrator which has a flush dash type of switch.

One adjustment.

Price $9, prepaid anywhere in the United States. Sold through the trade or direct.

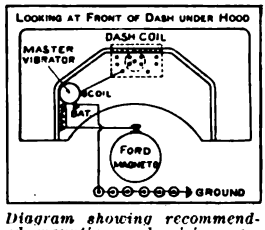
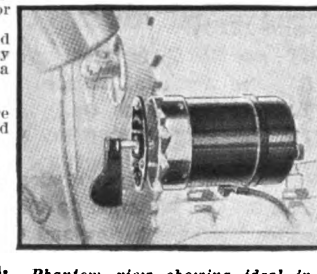


Diagram showing recommended mounting and wiring connection.

Connecticut Tel. and Electric Company, Inc.

Meriden Conn.



Phantom view showing ideal installation of the Connecticut Master Vibrator on Ford Dash.

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TACKS

UPHOLSTERY TACKS

ATLAS Tack Co., Fairhaven, Mass.

CLEVELAND Tack Works, 1313 E. 49th St., Cleveland, O.

COBB & Drew, Plymouth, Mass.

CRANDAL, Stone & Co., Binghamton, N. Y. "Leathermet."
(See page 369.)

EAGLE—See Turner & Seymour Mfg. Co.

GENESEE Tack Co., 39-57 Mt. Hope Ave., Rochester, N. Y.

GRAND Crossing Tack Co., (Grand Crossing), Chicago, Ill.

HIGGIN Mfg. Co., Newport, Ky.

LEATHERLIKE—See Turner & Seymour Mfg. Co.

LEATHERMET—See Crandal, Stone & Co.

MILONITE—See Morley Mfg. Co.

MILWAUKEE Tack Co., 27th Ave. & Wahl St., Milwaukee, Wis.

MORLEY Mfg. Co., 120 Boylston St., Boston, Mass. "Milonite."

NEIDER Co., F. A., Augusta, Ky.

PLYMOUTH Mills, Plymouth, Mass.

READE, Chas. W., 346 Sherman Ave., New Haven, Conn.

RIPLEY & Bartlett Co., Water St., Plymouth, Mass.

ROBERTS, G. G., South Ave., Whitman, Mass.

SALMOND & Son, Sam, Hanover, Mass.

SHELTON Co., Shelton, Conn.

TOCKWOTTON Co., 79 S. Main St., Providence, R. I.

TOWER Mfg. Co., Madison, Ind.

TURNER & Seymour Mfg. Co., Torrington, Conn. "Eagle," "Leatherlike."

WATERMAN Co., R. C., Water St., South Hanover, Mass.

TALC

TIRE TALC

AMERICAN Lava Co., Chattanooga, Tenn.

ARNSTEIN, Eugene, 46th St. & Wentworth Ave., Chicago, Ill. "Century."

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Prevento."
(See page 131.)

BESTYET—See St. Louis Rubber Cement Co.

CENTURY—See Arnstein, Eugene.

COHUTTA Talc Co., Dalton, Ga.

DOGGETT, Stanley, 11-13 Cliff St., New York, N. Y.

FAULTLESS—See Hawkeye Oil Co.

HAWKEYE Oil Co., Waterloo, Ia. "Faultless."

JEWEL—See Wadsworth-Howland Co.

MARSHALL Oil Co., Marshalltown, Ia. "Moco."

MOBO—See Stanley, John T.

MOCO—See Marshall Oil Co.

NATIONAL Cement & Rubber Co., 300-16 S. St. Clair St., Toledo, O.

NEVINS Co., Samuel, 109 E. Second St., Philadelphia, Pa.

NEW YORK Mica & Mfg. Co., Auburn, N. Y. "Wright."

NORTH Carolina Talc & Mining Co., Hewitts, N. C.

NORTHWESTERN Chemical Co., Marietta, O. "Slip-Easy."
(See page 131.)

OLD Roman Solder Co., 202 E. 46th St., New York, N. Y.

POUGHKEEPSIE Utilities Corp., 3840 Winnikee Ave., Poughkeepsie, N. Y. "Utility."

PREVENTO—See Atlas Auto Supply Co.

REFLEX Ignition Co., 211 High Ave., Cleveland, O.

ST. LOUIS Rubber Cement Co., 3046 Lambdin Ave., St. Louis, Mo. "Bestyet."

SIMPLEX Auto Specialty Co., 733 Woodward Ave., Detroit, Mich.

SLIP-EASY—See Northwestern Chemical Co.

STANLEY, John T., 642 W. 30th St., New York, N. Y. "Mobo."
(See page 523.)

STEWARD Mfg. Co., D. M., Chattanooga, Tenn.

TIRE-EZE—See Warren Refining Co.

U. S. Mica Mfg. Co., Lytton Bldg., Chicago, Ill.

UTILITY—See Poughkeepsie Utilities Corp.

WADSWORTH-HOWLAND Co., 225 Carpenter St., Chicago, Ill. "Jewel."

WARREN Refining Co., 1137 W. 11th St., Cleveland, O. "Tire-Eze."

WHITTAKER, W. H., 245 Front St., New York, N. Y.

WILLIAMS & Co., C. K., N. 13th St., Easton, Pa.

WRIGHT—See New York Mica & Mfg. Co

TANKS

ACETYLENE TANKS

ACETYLENE Gas Co., 752 S. Pierce St., Milwaukee, Wis.

FIREBALL Gas Tank & Illuminating Co., 5010 Delmar Blvd., St. Louis, Mo.

GAS Tank Recharging Co., 256 Fifth St., Milwaukee, Wis. "Sun-Lite."

METEOR Auto Tank Co., 1666 Broadway, New York, N. Y.

PREST-O-LITE Co., 1400 Speedway, Indianapolis, Ind.
(See page 515.)

TOWER Mfg. Co., Madison, Ind.

SEARCHLIGHT Co., 1016 Karpen Blvd., Chicago, Ill.

SUN-LITE—See Gas Tank Recharging Co.

EMERGENCY OR RESERVE TANKS

(For carrying a reserve supply of gasoline or oil)

DOVER Stamping & Mfg. Co., Cambridge, Mass.
(See page 139.)

VOGEL & Bros., Wm., Kent Ave., Brooklyn, N. Y.

Complete Index to Classification appears on Pages 8 to 26.

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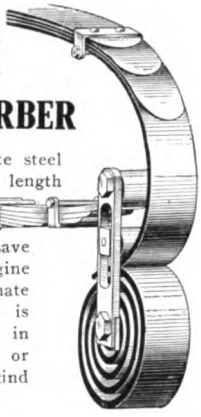
B AND R
SHOCK ABSORBER



consists of a convolute steel spring, 78 inches in length and is guaranteed to make any car ride 50% easier, to save the tires, gasoline, engine and practically eliminate spring breakage. It is easily attached and in need of no attention or adjustments of any kind after attachment.

We are offering a very attractive

DEALERS PROPOSITION

Many garages and supply houses are finding them most profitable and satisfactory. They are the only shock absorbers at anything near the same price that will absolutely absorb and

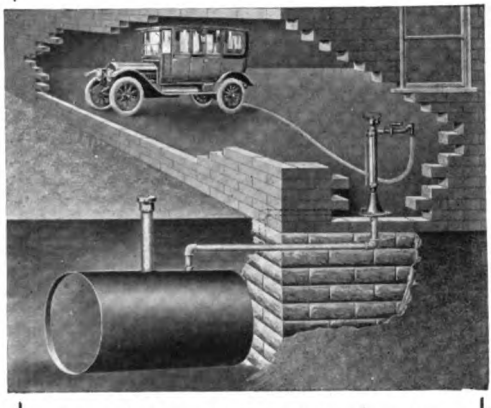
ELIMINATE THE REBOUND

The retail price is only $20 per pair, and we guarantee satisfaction. Let us hear from you today.

B & R Shock Absorber Co.
11 N. 20th St. Phila., Pa.

SCAIFE GASOLINE STORAGE OUTFITS

Have no complicated parts to get out of order.



The Cheapest Safe and Thoroughly Practical Outfit Sold.

Wm. B. SCAIFE & SONS CO.
Founded 1802
PITTSBURGH, PA.
New York Office: 26 Cortlandt St.

THE "KOVEN"
Galvanized Iron Gasoline Storage Tanks

ARE THE BEST AND CHEAPEST OBTAINABLE

L. O. KOVEN & BROTHER

50 CLIFF STREET, NEW YORK

WRITE FOR INFORMATION

AIR PRESSURE TANKS FOR GARAGE TIRE STATIONS
AIR PRESSURE MOTOR STARTER TANKS

ROUND AND SQUARE BOLSTER UNDERHUNG MODELS
"JASCO" LEAKLESS TANKS FOR TRUCKS AND BOATS

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TANKS (Continued)

FUEL AND WATER TANKS

A-Z Co., 530 W. 56th St., New York, N. Y.

AIR-TIGHT Steel Tank Co., Oliver Bldg., Pittsburg, Pa.

AMERICAN Steel Package Co., Defiance, O.

AUTO Metal Co., 520 Worthington St., Springfield, Mass.

AVERY Stamping Co., 5209 Lakeside Ave., Cleveland, O.

BADGER & Sons Co., E. B., 63-69 Pitts St., Boston, Mass.

BRISCOE Mfg. Co., Woodward & Baltimore Aves., Detroit, Mich.
(See page 331.)

BRISKIN Mfg. Co., 539 N. Capitol Ave., Indianapolis, Ind.

BUNN-HUTCHINSON Co., 2074 E. 22d St., Cleveland, O.

BUSH Mfg. Co., Hartford, Conn.
(See page 207.)

BUSHNELL Tank Works, Bushnell, Ill.

COLUMBUS Auto Brass Co., 767 N. Fourth St., Columbus, O.

DETROIT Auto Specialty Co., 909-11 Greenwood Ave., Detroit, Mich.

DETROIT Formed Metal Co., Larned & Shelby Sts., Detroit, Mich.

EUREKA Auto Parts Mfg. Co., 1915 Pine St., St. Louis, Mo.

FEDERAL Pressed Steel Co., Milwaukee, Wis.
(See page 157.)

FREELAND Sons Co., B. F., Sturgis, Mich.

GOETZ Co., 1802 Clybourn Ave., Chicago, Ill.

HAYES Mfg. Co., Detroit, Mich.

HEARD Mfg. Co., 1318 S. Main St., Los Angeles, Cal.

HUNT & Dorman Mfg. Co., 2102-10 Superior Ave., N. E., Cleveland, O.

IDEAL Sheet Metal Works, 2809 Michigan Ave., Chicago, Ill.
(See page 331.)

ILLINOIS Auto Sheet Metal Works, 58-60 E. 16th St., Chicago, Ill.

JANNEY, Steinmetz & Co., Philadelphia, Pa. "Jasco."
(See page 403.)

JASCO—See Janney, Steinmetz & Co.

JOHNSON'S Automobile Sheet Metal Works, W. N., 620-28 South J St., Richmond, Ind.

KELLS Mfg. Co., W. J., 521-25 W. 45th St., New York, N. Y.
(See page 203.)

KEYSTONE Sheet Metal Co., Ambridge, Pa.

KINSEY Mfg. Co., Toledo, O.

KOVEN & Bro., L. O., 59 Cliff St., New York, N. Y.
(See page 403.)

LAWSON Co., F. H., Cincinnati, O.

LONG Mfg. Co., Detroit, Mich.
(See page 327.)

METAL Auto Parts Co., Industrial Bldg., Indianapolis, Ind.

MICHIGAN Stamping Co., 759-71 Bellevue Ave., Detroit, Mich.

MITCHELL & Son, G. F., 6501 Cedar Ave., Cleveland, O.

MOLINE pressed Steel Co., East Moline, Ill.

NATIONAL Can Co., Detroit, Mich.
(See page 333.)

PARAGON Auto-Parts Mfg. Co., 506 W. 53d St., New York, N. Y.

PERFEX Radiator Co., Racine, Wis.

PRESSED Steel Tank Co., West Allis, Wis.

R. & H. Sheet Metal Co., Abington, Mass.

REID Co., 1504 Third Ave., Moline, Ill.

SAGINAW Sheet Metal Works, Saginaw, Mich.

SANFORD Mfg. Co., F. C., Bridgeport, Conn.
(See page 511.)

SCAIFE & Sons Co., Wm. B., Pittsburg, Pa.
(See page 403.)

SUSSMAN & Rosenberg Mfg. Co., M., Tarrytown, N. Y.

TODD Mfg. Co., 820-24 Mary Pl., Minneapolis, Minn.

TRAGESER Steam Copper Works, John, 447-57 W. 26th St., New York, N. Y.

WELDED Steel Barrel Corp., Leib & Wight Sts., Detroit, Mich.

WESTERN Drop Forge Co., Marion, Ind.
(See page 473.)

WISCONSIN Automobile Radiator Co., North Milwaukee, Wis.

XARDELL Bros. Co., 28 Broadway, Utica, N. Y.

GASOLINE STORAGE TANKS AND SYSTEMS

AIR-TIGHT Steel Tank Co., Oliver Bldg., Pittsburg, Pa.

AMERICAN Oil Pump & Tank Co., Central & Kindel Aves., Cincinnati, O.

AMERICAN Steel Package Co., Defiance, O.

ANCHOR Brass Works, 141-43 W. Austin Ave., Chicago, Ill. "Savo."

BEMAN Automatic Oil Can Co., Meadville, Pa.

BOWSER & Co., S. F., Fort Wayne, Ind.

BUSHNELL Tank Works, Bushnell, Ill.

BUTLER Mfg. Co., 1215-17 W. Tenth St., Kansas City, Mo.

CHAMPION—See Cleveland Faucet Co.

CLEVELAND Faucet Co., 708 Frankfort Ave., N. W., Cleveland, O. "Champion."

COLUMBIAN Steel Tank Co., 1605 W. 12th St., Kansas City, Mo.

DELPHOS Mfg. Co., 100-24 S. Pierce St., Delphos, O.

EASTERN Oil Tank Co., 146 Fletcher St., Lowell, Mass.

FREELAND Sons Co., B. F., Sturgis, Mich. "Pioneer."

GILBERT & Barker Mfg. Co., Springfield, Mass.

GROETKEN Pump Co., Aurora, Ill.

HARRY Steel Co., O. K., 2333-35 Papin St., St. Louis, Mo.

HELLER-ALLER Co., Napoleon, O.

Complete Index to Classification appears on Pages 8 to 26.

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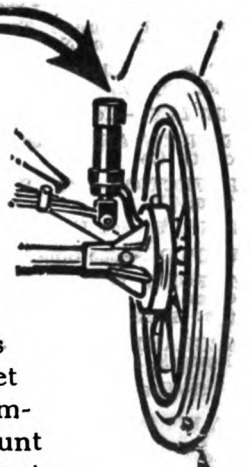

Forest City Electric Co.
5003 Windsor Ave. Cleveland, Ohio

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TANKS (Continued)

GASOLINE STORAGE TANKS AND SYSTEMS (Continued)

HOLIHAN Mfg. Co., 21st & Jefferson Sts., Detroit, Mich.

HYDRAULIC Oil Storage & Engineering Co., 22 Albany St., New York, N. Y. "Snells."

IDEAL—See Janney, Steinmetz & Co.

IDEAL—See Kupferle Bros. Mfg. Co.

IMPERIAL—See Western Oil Pump & Tank Co.

JANNEY, Steinmetz & Co., Philadelphia, Pa. "Ideal."
(See page 403.)

KOVEN & Bro., L. O., 50 Cliff St., New York, N. Y.
(See page 403.)

KUPFERLE Bros. Mfg. Co., 600-04 N. Second St., St. Louis, Mo. "Ideal."

LITTLE GEM—See Western Oil Pump & Tank Co.

LITTLE SAMPSON—See Western Oil Pump & Tank Co.

MILWAUKEE Tank Works, 146-56 Clinton St., Milwaukee, Wis.

NATIONAL Store Specialty Co., Bareville, Pa. "Pennsylvania."

NEIL & Co., Wm., 617 Division St., Chicago, Ill.

NILES Steel Tank Co., Niles, Mich.

NON-EXPLOSIVE Can Co., 127-29 S. Green St., Chicago, Ill. "Peerless."

NORWICH Storage Tank Co., Lackawanna Ave., Norwich, N. Y.

OFF & Co, Christian, 5 N. New Jersey St., Indianapolis, Ind.

PEERLESS—See Non-Explosive Can Co.

PENNSYLVANIA—See National Store Specialty Co.

PERFECTION—See Western Oil Pump & Tank Co.

PIONEER—See Freeland Sons Co.

PUMPLOK—See Simerson Co.

SANFORD Mfg. Co., F. C., Bridgeport, Conn.
(See page 511.)

SARGEANT Mfg. Co., New & Summit Sts., Newark, N. J.

SAVO—See Anchor Brass Works.

SCAIFE & Sons Co., Wm. B., Pittsburg, Pa.
(See page 403.)

SEXTON Can Co., 228 Franklin St., Boston, Mass.

SIMERSON Co., Chas. H. (W. Hoboken), Hoboken, N. J. "Pumplok."

SNELLS—See Hydraulic Oil Storage & Engineering Co.

STAR Brass Works, 1721-23 Baltimore Ave., Kansas City, Mo.

TAYLOR Mfg. Co., Montclair, N. J.

TIRRILL Gas Machine Lighting Co., 509 Fifth Ave., New York, N. Y.

TOKHEIM Mfg. Co., 815 N. First St., W., Cedar Rapids, Ia.

UNITED States Pump & Tank Co., 3947 Laclede Ave., St. Louis, Mo.

VAC Liquid Equipment Co., Cedar Rapids, Ia.

WALLMAN Mfg. Co., 283-87 Fifth Ave., Milwaukee, Wis.

WAYNE Oil Tank & Pump Co., Fort Wayne, Ind.

WELDED Steel Barrel Corp., Leib & Wight Sts., Detroit, Mich.

WESTERN Oil Pump & Tank Co., 2437 Kosciusko St., St. Louis, Mo. "Little Sampson," "Imperial," "Perfection," "Little Gem."

OXYGEN TANKS

LINDE Air Products Co., 42d St. Bldg., New York, N. Y.

STANDARD Oxygen Co., 12th & Grand Sts., Hoboken, N. J.

TIRE INFLATING TANKS

BISHOP-BABCOCK-BECKER Co., Cleveland, O.

CLEVELAND Faucet Co., 708 Frankfort Ave., N. W., Cleveland, O.

LENNOX Chemical Co., 1201 E. 55th St., Cleveland, O.

LIQUID Carbonic Co., 3100 S. Kedzie Ave., Chicago, Ill.

PREST-O-LITE Co., 1400 Speedway, Indianapolis, Ind.

TIRE TESTING TANKS

DOVER Stamping & Mfg. Co., Cambridge, Mass.
(See page 139.)

VACUUM GASOLINE TANKS

STEWART-WARNER Speedometer Corp., 1904 Diversey Blvd., Chicago, Ill.
(See page 555.)

TAPE

INSULATING AND TIRE TAPE

BESTYET—See St. Louis Rubber Cement Co.

BLACK DIAMOND—See Dunton Co.

BOSTON Woven Hose & Rubber Co., 110 Portland St., Cambridge, Mass. "Evergrip."

CLIFTON Mfg. Co. (Jamaica Plain), Boston, Mass.

DUNTON Co., M. W., Providence, R. I. "Black Diamond."

EVERGRIP—See Boston Woven Hose & Rubber Co.

INDIANA Rubber & Insulated Wire Co., Jonesboro, Ind.

J-M—See Johns-Manville Co.

JOHNS-MANVILLE Co., H. W., Madison Ave. & 41st St., New York, N. Y. "J-M."

KERITE Insulated Wire & Cable Co., 30 Church St., New York, N. Y.

MANSON—See Okonite Co.

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If you would visit our wonderfully equipped plant at Waterbury and see how our castings are made, you would understand our reasons for calling them "quality castings."

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TAPE (Continued)

INSULATING AND TIRE TAPE (Continued)

NEW York Insulated Wire Co., 114 Liberty St., New York, N. Y.

OKONITE Co., 253 Broadway, New York, N. Y. "Manson."

RUSSELL Mfg. Co., Middletown, Conn.

ST. LOUIS Rubber Cement Co., 3646 Lambdin Ave., St. Louis, Mo. "Bestyet."

UNITED States Tire Co., Broadway & 56th St., New York, N. Y.

VAN Cleef Bros., 7709-11 Woodlawn Ave., Chicago, Ill.

WESTINGHOUSE Electric & Mfg. Co. (E. Pittsburg), Pittsburg, Pa.

TAXIMETERS

AMERICAN Taximeter Co., 735-37 Seventh Ave., New York, N. Y. "Popp," "Jones."

INTERNATIONAL Taxameter Co. of America, 239 W. 68th St., New York, N. Y.

JONES—See American Taximeter Co.

PITTSBURG Taximeter Co., Centre & Negley Aves., Pittsburg, Pa.

POPP—See American Taximeter Co.

TEES

PIPE TEES

(See Fittings, Pipe)

TELEPHONES

LIMOUSINE TELEPHONES

(For Speaking Tubes—See Tubes, Speaking; For Annunciators—See Annunciators)

AMERICAN Electric Co., State & 64th Sts., Chicago, Ill. "Carphone."

CARPHONE—See American Electric Co.

CHAU-PHONE—See Western Electric Co.

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y.
(See page 87.)

WESTERN Electric Co., 463 West St., New York, N. Y. "Chau-Phone."

TERMINALS

WIRE TERMINALS

(See also Connectors, Battery)

BARCY-NICHOLSON Co., 345 Fort St., W., Detroit, Mich.

BECCO—See Michigan Motor Specialties Co.

BLISS-CHESTER Co., Providence, R. I. "Duplex."
(See page 409.)

BOSCH Magneto Co., 223 W. 46th St., New York, N. Y.

BREAZNELL, J. H., 26 Court St., Brooklyn, N. Y.
(See page 137.)

CHAMPION Spark Plug Co., 1010 Avondale Ave., Toledo, O.
(See pages 297, 298, 299 and 300.)

CONNECTICUT Telephone & Electric Co., Meriden, Conn.
(See page 401.)

DUPLEX—See Bliss-Chester Co.

ELK Mfg. Co., 68 E. 131st St., New York, N. Y.

EUREKA—See Morse, Frank W.

EVERETT Mfg. Co., 162-64 N. May St., Chicago, Ill.

FAHNESTOCK Electric Co., 129 Patchen Ave., Brooklyn, N. Y.

FITZGERALD Mfg. Co., Torrington, Conn.
(See page 219.)

GOODSON—See Graham Mfg. Co.

GRAHAM Mfg. Co., 94 Point St., Providence, R. I. "Goodson."

GROSSMAN Mfg. Co., Emil, Bush Terminal, Brooklyn, N. Y.

HERZ & Co., 245 W. 55th St., New York, N. Y.
(See page 311.)

HI-PO Waterproof Battery Co., 1007 Atlantic Ave., Brooklyn, N. Y.

J-M—See Johns-Manville Co.

JOHNS-MANVILLE Co., H. W., Madison Ave. & 41st St., New York, N. Y. "J-M."

KINSEY Mfg. Co., Toledo, O.

LOMBARDI Motor Car Co., 67-71 Minerva St., Derby, Conn.

MICHIGAN Motor Specialties Co., 518-20 Woodbridge St., E., Detroit, Mich. "Becco."
(See page 137.)

MORSE, Frank W., 516 Atlantic Ave., Boston, Mass. "Eureka."

MOSLER & Co., A. R., Box M, Mt. Vernon, N. Y.
(See page 303.)

NOONAN Tool & Machine Works, A. S., 130-36 St. James St., Rome, N. Y.

PITTSFIELD Spark Coil Co., Dalton, Mass.
(See page 127.)

RAJAH Auto-Supply Co., Bloomfield, N. J.
(See page 311.)

SHAIN, Chas. D., Box 53, Station L., Brooklyn, N. Y.
(See page 509.)

SIMPLEX Auto Specialty Co., 733 Woodward Ave., Detroit, Mich.

SUPERIOR Metal Products Co., Elyria, O.

WESTERN Electric Co., 463 West St., New York, N Y.

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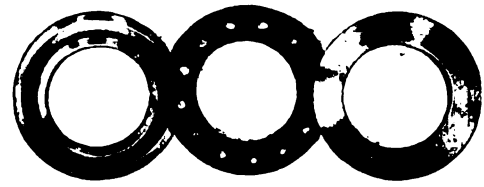
We Manufacture
SUPERIOR QUALITY
BALL AND ROLLER BEARINGS



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Cleveland Ball Bearing Co.
Cleveland, Ohio

WITH OUR SPACERS a worn bearing looks newer than an unused bearing. Saves half the cost of replacing with new ones.
We regrind Engine Cylinders, make new pistons and piston rings to fit.
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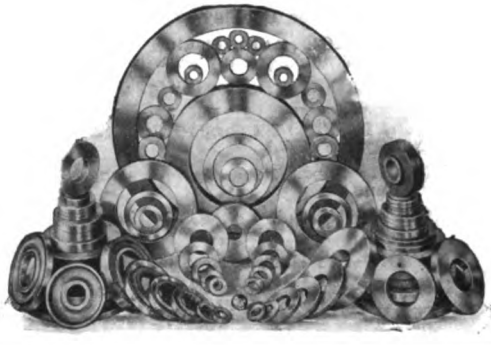

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of tool steel, hardened and ground, made to customer's specifications. Our excellent facilities insure high grade work. Send blueprints of sizes today for quotation.
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BATTERY CONNECTORS (Flexible)
PRESSED COPPER LUGS
MINIATURE AND CANDELABRA LAMP BASES
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PROVIDENCE, R. I.

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TESTERS

BATTERY TESTERS

(See Hydrometers)

ACID TESTERS

(See Gauges, Battery)

GASOLINE TESTERS

(See Hydrometers)

THERMOMETERS

VULCANIZER THERMOMETERS

QUEEN-GRAY Co., 616-18 Chestnut St., Philadelphia, Pa.

RANDALL-FAICHNEY Co., Boston, Mass. "Ranfac."

RANFAC—See Randall-Faichney Co.

STANDARD Thermometer Co., 65 Shirley St., Boston, Mass.
(See page 431.)

TAYLOR Instrument Cos., 95 Ames St., Rochester, N. Y.

WEINHAGEN, H., 159-65 Leonard St., New York, N. Y.

WILSON & Wilson (Waverly Sta.), Boston, Mass.

THREAD

TOP AND UPHOLSTERY THREAD

AMERICAN Thread Co., 260 W. Broadway, New York, N. Y.

COLUMBIA—See Meyer & Co.

CRESCENT—See Meyer & Co.

HUB—See Meyer & Co.

MEYER & Co., John C., Lowell, Mass. "Hub," "Crescent," "Columbia," "Ruby."

RUBY—See Meyer & Co.

SUMMIT Thread Co., Summit St., East Hampton, Conn.

TIMERS

IGNITION OR SPARK TIMERS

(See also Systems, Single Spark Ignition)

ALMY Water Tube Boiler Co., ft. Rhoades St., Providence, R. I.

AMERICAN Electric Co., State & 64th Sts., Chicago, Ill. "Samson."

AMERICAN Garage & Timer Co., Suffolk, Va. "Edgerton."

AMPCO—See S-M Novelty Mfg. Co.

BECKLEY-RALSTON Co., Michigan Ave. & Randolph St., Chicago, Ill. "Maximus."

BEMUS—See Motor Specialties Co.

BENFORD Mfg. Co., Box H., Mt. Vernon, N. Y. "Monarch."
(See page 305.)

BLACKBURN - ALLEN Co., Dayton, O. "Noxon."

BLITZ—See Electrical Specialty Mfg. Co.

CONNECTICUT Telephone & Electric Co., Meriden, Conn.
(See page 401.)

CUNO Engineering Corp., 80 S. Vine St., Meriden, Conn.

EDGERTON—See American Garage & Timer Co.

ELECTRICAL Specialties Mfg. Co., 1125 N. 22d St., Omaha, Neb. "Blitz," "Intensifire."

HEINZE Electric Co., Lowell, Mass.
(See page 479.)

HERZ & Co., 245 W. 55th St., New York, N. Y.
(See page 311.)

INTENSIFIRE — See Electrical Specialties Mfg. Co.

INTER-STATE Machine Co., Rochester, N. Y. "Leavitt," "Uncas."

KLAHN—See Mosler & Co.

LEAVITT—See Inter-State Machine Co.

LEHMAN Mfg. Co., J. H., 727 Seventh Ave., New York, N. Y.

LONG Bros., Broadway & Buckeye St., Kokomo, Ind.

LUNDGREN Mfg. Co., Hale Bldg., Philadelphia, Pa.

MAXIMUS—See Beckley-Ralston Co.

MILWAUKEE Auto Engine & Supply Co., 706-08 Winnebago St., Milwaukee, Wis.

MONARCH—See Benford Mfg. Co.

MOSLER & Co., A. R., Box M, Mt. Vernon, N. Y. "Klahn," "Umph."
(See page 303.)

MOTOR Specialties Co., Waltham, Mass. "Bemus."

NEW YORK Coil Co., 338-40 Pearl St., New York, N. Y. "Rhoades."

NOXON—See Blackburn-Allen Co.

PERFEX—See Samson Electric Co.

PITTSFIELD Spark Coil Co., Dalton, Mass.
(See page 127.)

RHOADES—See New York Coil Co.

S-M Novelty Mfg. Co., 52d St. & Baltimore Ave., Philadelphia, Pa. "Ampco."

SAMSON—See American Electric Co.

SAMSON Electric Co., Canton, Mass. "Perfex."

SINTZ—See Wilmarth & Morman Co.

SPLITDORF Electrical Co., Newark, N. J.
(See page 161.)

TRIO Mfg. Co., 1192-1206 Bellevue Ave., Detroit, Mich.

UMPH—See Mosler & Co.

UNCAS—See Inter-State Machine Co.

WELLS Mfg. Co., R. C., Fond du Lac, Wis.

WILMARTH & Morman Co., 1179 Monroe Ave., N. W., Grand Rapids, Mich. "Sintz."

ZIMMERMAN-SMITH Co., 72-74 Main St., North Tonawanda, N. Y.

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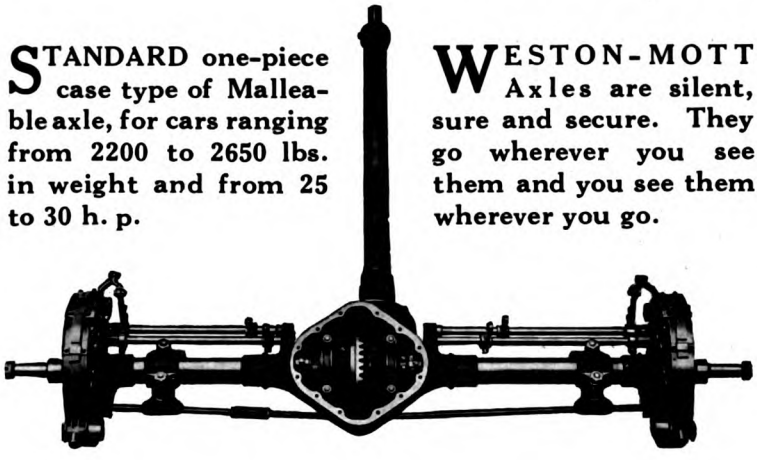
STANDARD one-piece case type of Malleable axle, for cars ranging from 2200 to 2650 lbs. in weight and from 25 to 30 h. p.

WESTON-MOTT Axles are silent, sure and secure. They go wherever you see them and you see them wherever you go.



This type of axle has all the modern improvements. The case is provided with a cover, which gives easy access to all the internal parts. The axle shafts are withdrawable. The differential can be removed without taking axle from under the car. Adjustments have been provided for on the ring gear and pinion. The axle is three-quarter floating type. Differential and hub bearings are the Hyatt quiet type, pinion being mounted on annular bearings. Brake equipment is Weston-Mott standard, internal expanding and external contracting type.

This is one of our popular models and has all the latest improvements and refinements desirable in modern axle construction

WESTON-MOTT AXLES

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BURNER TIPS

(See Burners, Acetylene)

TIRES

FLANGED STEEL TIRES

(For adapting automobiles to run on railroad tracks)

GOODMAN Co., Herrin, Ill.

LEATHER TIRES

(For Leather Treads—See Treads, Detachable)

HORSESHOE—See Racine Auto Tire Co.

RACINE Auto Tire Co., 200 Clark St., Racine, Wis. "Horseshoe."

PNEUMATIC TIRES

(See also Tubes, Inner)

ACME Rubber Mfg. Co., Trenton, N. J.

ADVANCE Rubber Co., 18th St. & Eighth Ave., Brooklyn, N. Y.

AJAX-GRIEB Rubber Co., Trenton, N. J.

BATAVIA Rubber Co., Batavia, N. Y.

BRAENDER Rubber & Tire Co., Rutherford, N. J. "Bull Dog."
(See page 429.)

BRIARCLIFF—See Century Rubber Co.

BUCYRUS Rubber Co., Bucyrus, O.

BULL DOG—See Braender Rubber & Tire Co.

CANVAS Tread Tire Co., Utica, N. Y.

CARSPRING—See New Jersey Car Spring & Rubber Co.

CATARACT Rubber Co., Wooster, O.

CENTURY Rubber Co., Plainfield, N. J. "Briarcliff," "Gripground."

COLUMB Tyres Import Co., 1891 Broadway, New York, N. Y. (Importers.) "Prowodnik."

COMBINATION Rubber Mfg. Co., Bloomfield, N. J.

CONGRESS—See McGraw Tire & Rubber Co.

CONVERSE Rubber Shoe Co., Malden, Mass. "Tuff-E-Nuff."

CROWN—See Great Eastern Rubber Co.

DAYTON Rubber Mfg. Co., 1204 Kiser St., Dayton, O.
(See page 415.)

DIAMOND Rubber Co., Akron, O.

DREADNAUGHT Tire & Rubber Co., Baltimore, Md.
(See page 429.)

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J.

ENGLEBERT Tyre Co., 1928 Broadway, New York, N. Y. (Importers.)

FALLS Rubber Co., Cuyahoga Falls, O. "Greyhound."

FEDERAL Rubber Mfg. Co., Milwaukee, Wis.

FELLSEN Tire Co., 1995 Broadway, New York, N. Y.

FIRESTONE Tire & Rubber Co., Akron, O.

FISK Rubber Co., Chicopee Falls, Mass.

FRONTIER Tire & Rubber Co., 1054 Main St., Buffalo, N. Y.

GAULOIS Tire Corp., 49 W. 64th St., New York, N. Y. (Importers.)
(See page 419.)

GLOBE—See United & Globe Rubber Mfg. Cos.

GOODRICH Co., B. F., Akron, O.

GOODWEAR Tire Co., Chicago, Ill.

GOODYEAR Tire & Rubber Co., Akron, O.

GREAT Eastern Rubber Co., 1027 Hamilton St., Allentown, Pa. "Crown," "Premier."

GREYHOUND—See Falls Rubber Co.

GRIPGROUND—See Century Rubber Co.

HARDMAN Tire & Rubber Co., Mill & Main Sts., Belleville, N. J.

HOOD Rubber Co., Watertown, Mass.
(See page 429.)

HORSESHOE—See Racine Auto Tire Co.

HYDRO—See St. Louis Tire & Rubber Co.

IMPERIAL—See McGraw Tire & Rubber Co.

INDIANA Rubber & Insulated Wire Co., Jonesboro, Ind.

KELLY-SPRINGFIELD Tire Co., 229 W. 57th St., New York, N. Y.
(See page 417.)

KNIGHT Tire & Rubber Co., Canton, O.

L. & M. Rubber Co., Chicago, Ill.

LEE Tire & Rubber Co., Conshohocken, Pa.

M & M—See Morgan & Marshall Rubber & Tire Co.

McGRAW Tire & Rubber Co., East Palestine, O. "Imperial," "Congress," "Pullman."
(See page 413.)

MANHATTAN Rubber Mfg. Co., Passaic, N. J.

MANSFIELD Tire & Rubber Co., Newman St., Mansfield, O.

MARATHON Tire & Rubber Co., Front St., Cuyahoga Falls, O.

MATTSON Rubber Co., Lodi, N. J.
(See page 291.)

MICHELIN Tire Co., Milltown, N. J.

MIDGLEY Tire & Rubber Co., Lancaster, O.
(See page 415.)

MILLER Rubber Co., Akron, O.

MOHAWK Rubber Co., Akron, O.

MORGAN & Marshall Rubber & Tire Co., East Liverpool, O. "M & M."

NASSAU—See Thermoid Rubber Co.

NATIONAL Co., 1400-10 Clybourn Pl., Chicago, Ill.

NEW Jersey Car Spring & Rubber Co., Wayne & Brunswick Sts., Jersey City, N. J. "Carspring."

NORTHLAND Rubber Co., 703-11 Northland Ave., Buffalo, N. Y.

PACKARD—See Pharis Tire & Rubber Co.

PATTERSON Rubber Co., Lowell, Mass.

PENNSYLVANIA Rubber Co., Jeannette, Pa.

PHARIS Tire & Rubber Co., W. Main St., Newark, O. "Packard."

PORTAGE Rubber Co., Akron, O.

PREMIER—See Great Eastern Rubber Co.

PROWODNIK—See Columb Tyres Import Co.

PULLMAN—See McGraw Tire & Rubber Co.

Complete Index to Classification appears on Pages 8 to 26.

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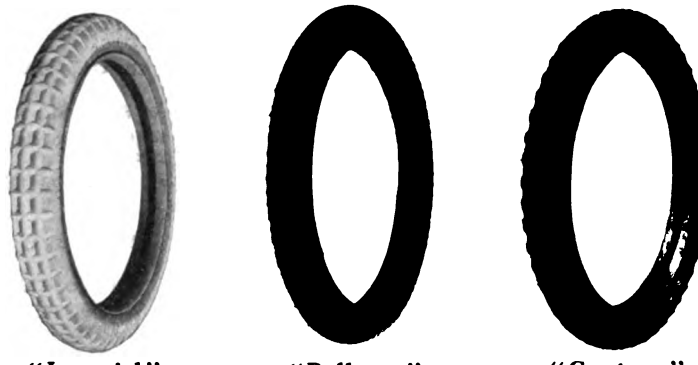
DEALERS!!



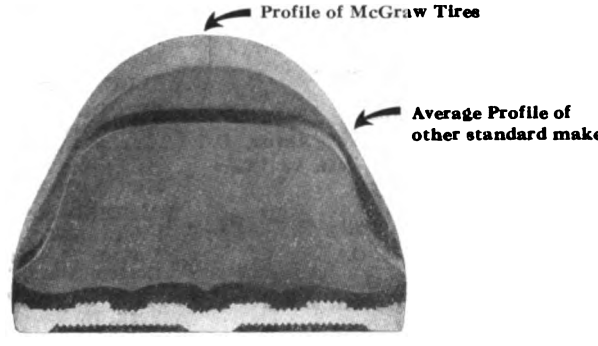
"Imperial" "Pullman" "Congress"

Pneumatic Automobile Tires

Guaranteed for 3500 Miles

Security, Service and Satisfaction assured

We have an unparalleled proposition for Wholesale Jobbers



E. C. McGraw Truck Tires

Guaranteed for 10,000 Miles

Note the **McGraw profile** compared with other makes

WRITE FOR CIRCULAR AND PRICES

THE McGRAW TIRE & RUBBER COMPANY

EAST PALESTINE, OHIO

Branches:

New York
Chicago
Boston

Kansas City
Dallas
Atlanta

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TIRES (Continued)

PNEUMATIC TIRES (Continued)

QUAKER City Rubber Co., 629 Market St., Philadelphia, Pa.

RACINE Auto Tire Co., 200 Clark St., Racine, Wis. "Horseshoe."

RACINE Rubber Co., Racine, Wis. (See page 417.)

REPUBLIC Rubber Co., Youngstown, O.

RUTHERFORD Rubber Co., Rutherford, N. J. "Sterling."

ST. LOUIS Tire & Rubber Co., St. Louis, Mo. "Hydro."

SAVAGE Tire Co., Main & Sicard Sts., San Diego, Cal.

SEAMLESS Rubber Co., New Haven, Conn.

STERLING—See Rutherford Rubber Co.

STODDARD, C. H., Worcester, Mass.

SWINEHART Tire & Rubber Co., Akron, O.

TEN Broeck Tyre Co., 840 S. 26th St., Louisville, Ky.

THERMOID Rubber Co., Trenton, N. J. "Nassau." (See page 57.)

TUFF-E-NUFF—See Converse Rubber Shoe Co.

TYER Rubber Co., Andover, Mass. "Tyrian."

TYRIAN—See Tyer Rubber Co.

UNITED States Tire Co., Broadway & 58th St., New York, N. Y.

UNITED & Globe Rubber Mfg. Cos., Trenton, N. J. "Globe."

ZEE Zee Tire & Rubber Co., 33d & Walnut Sts., Philadelphia, Pa.

SOLID TIRES

BUCYRUS Rubber Co., Bucyrus, O.

DIAMOND Rubber Co., Akron, O.

FIRESTONE Tire & Rubber Co., Akron, O.

GAULOIS Tire Corp., 49 W. 64th St., New York, N. Y. (Importers.) (See page 419.)

GIBNEY Tire & Rubber Co., Philadelphia, Pa.

GOODRICH Co., B. F., Akron, O.

GOODYEAR Tire & Rubber Co., Akron, O.

HOOD Rubber Co., Watertown, Mass. (See page 429.)

HYDRO—See St. Louis Tire & Rubber Co.

KELLY-SPRINGFIELD Tire Co., 229 W. 57th St., New York, N. Y. (See page 417.)

McGRAW Tire & Rubber Co., East Palestine, O. (See page 413.)

MILFORD Rubber Works, Milford, Ill.

PENNSYLVANIA Rubber Co., Jeannette, Pa.

POLACK Tyre & Rubber Co., 246 W. 59th St., New York, N. Y.

PORTAGE Rubber Co., Akron, O.

REPUBLIC Rubber Co., Youngstown, O.

ST. LOUIS Tire & Rubber Co., St. Louis, Mo. "Hydro."

SWINEHART Tire & Rubber Co., Akron, O.

UNITED States Tire Co., Broadway & 58th St., New York, N. Y.

VICTOR Rubber Co., Springfield, O.

VULCAN Rubber Co., Ninth & State Sts., Erie, Pa. "Vulco."

VULCO—See Vulcan Rubber Co.

SPECIAL TIRES

AIRPLEX Inner Tire Co., 3147 Locust St., St. Louis, Mo.

AMERICAN Spring Tire Co., 118 N. La Salle St., Chicago, Ill.

BRIDGE Web Tire Co., 2962 Prairie Ave., Chicago, Ill.

CARBONE Co., 100 State St., Albany, N. Y.

CARHART Laminated Tire Co., Moore Bldg., San Antonio, Tex.

DAYTON Rubber Mfg. Co., 1204 Kiser St., Dayton, O. (See page 415.)

DEERY & Co., D. H., 37 E. Washington Ave., Bridgeport, Conn.

DIVINE Tire Co., 800 Broad St., Utica, N. Y.

EXPANSION Spring Rim Tire Co., 120 Boylston St., Boston, Mass.

FAVARY Tire Co., 734 Fifth Ave., New York, N. Y.

LEE Tire & Rubber Co., Conshohocken, Pa.

McNAULL Auto Tire Co., 507-13 Superior St., Toledo, O.

MODERN Railway Appliance Co., 981 Broadway, Albany, N. Y. "Simmons."

MOLLITOR Tire Co., 4241 Irving Park Blvd., Chicago, Ill.

MOTZ Tire & Rubber Co., Akron, O. (See page 415.)

PIONEER Auto & Vehicle Co., 3400 S. Broadway, St. Louis, Mo.

R. & S. Tire Co., 247 Jefferson Ave., Detroit, Mich.

RELIANCE—See Stahle Mechanical Tire Co.

ST. JOHNS Rubber Tire Co., 116 Broad St., New York, N. Y.

SIDNEY Punctureless Pneumatic Tire Co., East St. Louis, Ill. (See page 431.)

SIMMONS—See Modern Railway Appliance Co.

STAHLE Mechanical Tire Co., 110 State St., Boston, Mass. "Reliance."

STEEL Cushion Tire Co., 1 W. 34th St., New York, N. Y.

INEHART Tire & Rubber Co., Akron, O.

TRAUTMAN'S Air-Rubber Tube Co., 129 Sixth Ave., Brooklyn, N. Y.

TOOLS

CHAIN REPAIR TOOLS

BROWN & Son, J. C., Butler, Ind.

HARRIS & Reed Mfg. Co., 1500-22 W. 15th St., Chicago, Ill.

MACQUIC—See Macdonald & Co.

NECESSITY—See Macdonald & Co.

MACDONALD & Co., J. N. Wethersfield, Conn. "Necessity." "Macquic."

MEYERS, Henry T. C., 285 Helen Ave., Detroit, Mich.

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Save the Car

Seventy per cent of this year's Electric Pleasure Cars are equipped with Motz Cushion Tires.
Commercial Truck owners also are coming more and more to Motz Tires.
For Motz Tires mean *car insurance* as well as riding comfort. They make rough roads smooth. There can be no blowouts—no punctures—no idle car through tire trouble.

Motz Cushion Tires

The slantwise bridges and undercut sides take up the strain, jolt, and jar. The dual treads mean added resiliency. And Motz tires have *more* and *better* rubber than others. The tread notches prevent skidding, an important advantage in places where metal non-skid devices are not allowed.

NOTE THE MILEAGE.
Motz Tires also mean most mileage.
They are guaranteed for 10,000 miles. Many have traveled 20,000 and even 25,000 miles without trouble.
The Motz Book No. 80 on Tires will interest you. Write for it. It's free.

The Motz Tire & Rubber Company
Akron, Ohio

Branches and Distributors in 52 Cities **Dealers Everywhere**

The Famous

Midgley Tread Tires

Are now being manufactured by

THE MIDGLEY TIRE & RUBBER COMPANY

We also make a full line of Wrapped Tread Covers, Tubes, etc., of quality.

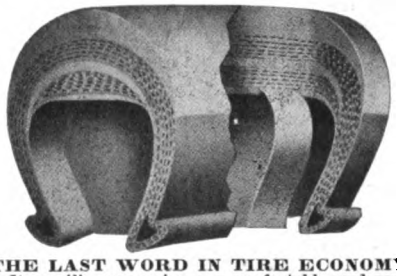
Live distributors and dealers desiring exclusive territory for these tires should communicate with us at once, telling about themselves and inviting our proposition.

The Midgley Tire & Rubber Company
Lancaster, Ohio

HARRY DAVIS, President
THOS. MIDGLEY, First Vice-President and General Manager
HENRY PLOW, Second Vice-President and Sales Manager
G. A. STEPHENSON, Secretary and Treasurer

THE CONSTRUCTION DOES IT

THE DAYTON AIRLESS TIRE



THE LAST WORD IN TIRE ECONOMY
Its resiliency carries you comfortably and protects your car.

For Gasoline Cars
Our orders show a tremendous increase.

For Electric Cars
Excellent mileage results—no tire troubles.

For Trucks and Delivery Cars
No delays—cheaper mileage—economy.

For Fire Apparatus
75% of all motor fire apparatus—Dayton Airless.

Let us help you reduce your tire expense.

THE DAYTON RUBBER MFG. CO.
1204 Kiser St. Dayton, Ohio
Some good dealers territory still open

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TOOLS (Continued)

ELECTRO MAGNETIC LIFTING TOOLS

(For lifting bolts, nuts, etc., from cylinders, gear cases, pans, etc.)

J. & B. Mfg. Co., 65 Eagle St., Pittsfield, Mass.

SYPHER Tool Mfg. Co., 2208 Warren St., Toledo, O.

W. & L. Mfg. Co., Buffalo, N. Y.

PISTON RING REMOVING TOOLS

EMPIRE—See S. B. R. Specialty Co.

END-OXY Appliance Co., Trenton, N. J.

McKAY-LEES Co., Chamber of Commerce Bldg., New Haven, Conn. "Sword."

S. B. R. Specialty Co., 17-19 Princeton St., East Orange, N. J. "Empire."

SWORD—See McKay-Lees Co.

SPRING LEAF SEPARATING TOOLS

(For separating the spring leaves so they may be lubricated)

AUTO-SPRING Oiling Facilitator Co., 1220 E. 71st St., Cleveland, O.

BUCKEYE—See Central Brass & Fixture Co.

BULL DOG—See Hamilton Mfg. Co.

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O. "Buckeye."

DAYTON Malleable Iron Co., Dayton, O.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco."
(See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

HALLADAY Co, L. P., Dept. A., Streator, Ill.
(See page 359.)

HAMILTON Mfg. Co., 303 W. 12th St., Anderson, Ind. "Bull Dog."

KNOWLSONS—See Spring Leaf Lubricator Co.

MILLER, Chas. E., 1400 S. Meridian St., Anderson, Ind.

MORGAN Mfg. Co., John St., Newport, R. I.

NELSON Mfg. Co., A., 564-72 W. Randolph St., Chicago, Ill.

SECURITY Reliner Co., 33 Meade St., Montgomery, N. Y.

SPRING Leaf Lubricator Co., 1002 Forest Ave., Ann Arbor, Mich. "Knowlsons."

STANDARD Engineering Works, 59 Social St., Woonsocket, R. I.

TIRE CHAIN ATTACHING TOOLS

BUFFUM Tool Co., Louisiana, Mo.

GEIER Co., P. A., 5112 St. Clair Ave., E., Cleveland, O.

K-A-L Supply Co., Jenkins Arcade Bldg., Pittsburg, Pa. "Kum-A-Long."

KUM-A-LONG—See K-A-L Supply Co.

TIRE CHAIN REPAIR TOOLS

BUFFUM Tool Co., Louisiana, Mo.

SHELLEY Tool Co., Saranac Lake, N. Y.

TIRE TOOLS

(For taking off and putting on tires)

AMERICAN Carboneter Co., 1514 Michigan Ave., Chicago, Ill. "Johnson."

AMERICAN Ever Ready Co., 316 Hudson St., New York, N. Y. "Ever Ready."

BECCO—See Michigan Motor Specialties Co.

BLUE Ribbon Tire Iron Co., 283-95 Fairfield Ave., Bridgeport, Conn.

BRICKEY, R. S., Aberdeen, S. Dak.

CALNAN Tire Remover Co., West Upton, Mass.

CARLSON & Co., Charles G., 3725 Wall St., Chicago, Ill. "Star."

CENTRAL Brass & Fixture Co., N. Fountain Ave., Springfield, O. "Springfield."

CLINCHER-TIRE-PLOW Co., 818 Penobscot Bldg., Detroit, Mich.
(See page opp. Last Page.)

DAYTON Malleable Iron Co., Dayton, O.

EASTMAN & Gale, Detroit, Mich. "Weiser's E. Z."
(See page 471.)

ECLIPSE—See Shawver Co.

EMPIRE—See S. B. R. Specialty Co.

EVER READY—See American Ever Ready Co.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco."
(See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

GIANT—See M. & G. Tire Tool Co.

HOOVER Co., W. H., New Berlin, O.

JIFFY—See R. & B. Mfg. Co.

JOHNSON—See American Carboneter Co.

L. & M.—See Long Machine Works.

LONG Machine Works, Adam A., Ave. E & St. Paul St., Rochester, N. Y. "L. & M."

M. & G. Tire Tool Co., 134 Washington St., Providence, R. I. "Giant."

McPHERSON BROS., 11 Bank St., Le Roy, N. Y.

MAX Machine Co., Clinton, Mass.

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

MICHIGAN Motor Specialties Co., 518-20 Woodbridge St. E., Detroit, Mich. "Becco."
(See page 137.)

MILLER Bros. Auto & Supply House, 1105-07 14th St., N. W., Washington, D. C. "Nelson."

MORGAN Mfg. Co., John St., Newport, R. I.

MORRIS—See Pratt Mfg. Co.

NATIONAL Jack & Mfg. Co., 130-32 S. Clinton St., Chicago, Ill.

NELSON—See Miller Bros. Auto & Supply House.

NELSON, A. A., Warrenton, Va.

NELSON Mfg. Co., A., 564-72 W. Randolph St., Chicago, Ill.

NOONAN Tool & Machine Works, A. S., 130-36 St. James St., Rome, N. Y.

PERFECT—See Pratt Mfg. Co.

PERFECT HANDLE—See Smith & Co.

PERFECTION Mfg. Co., New Martinsville, W. Va.

PRATT Mfg. Co., Wm. E., 35 W. Lake St., Chicago, Ill. "Morris," "Perfect."

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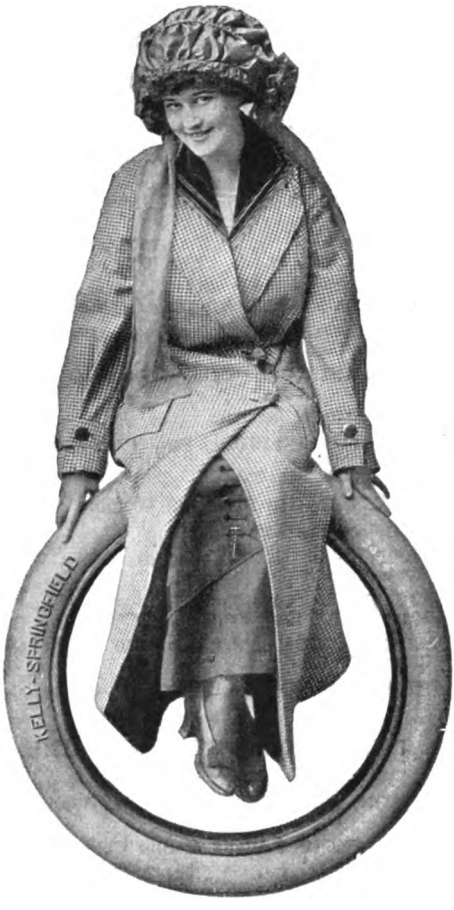
RACINE
AUTOMOBILE TIRES

Distributors

Arbogast Tire & Vulcanizing Co.....124 Erie Street, Toledo, O.
Automobile Equipment Co....225 Jefferson Avenue, Detroit, Mich.
Brazil Tire & Vulcanizing Co..314 N. Michigan Ave., Chicago, Ill.
Geo. W. Burkert & Co.....619 Wisconsin Street, Racine, Wis.
I. J. Cooper Rubber Co.....717 Main Street, Cincinnati, O.
I. J. Cooper Rubber Co.....25 N. Jefferson Street, Dayton, O.
I. J. Cooper Rubber Co.....263 N. Fourth Street, Columbus, O.
I. J. Cooper Rubber Co..219-221 W. Vermont St., Indianapolis, Ind.
J. C. Coxe Co.....126 Main Street, Whitewater, Wis.
Crescent Motor Co.....56-60 Main Street, Fond du Lac, Wis.
Courtney Motor Co.....Cedar Rapids, Ia.
Electrical Construction Co.....510-12 College Avenue, Racine, Wis.
J. G. Gareis Co.....123 Seventh Street, Pittsburgh, Pa.
J. H. Grimm Motor Car Co....100-108 W. 4th Street, Muscatine, Ia.
Herring Motor Co.....Herring Motor Building, Des Moines, Ia.
C. O. & E. S. Josslyn.....604 S. Main Street, Oshkosh, Wis.
J. A. Kurt Tire Co.....1529 Grand Avenue, Kansas City, Mo.
A. L. Kurtz Tire & Rubber Co.....805 Main Street, Peoria, Ill.
Marshall-Racine Rubber Co....911 Marquette Avenue, Minneapolis
E. J. Miles & Co.....Newton, Ia.
Model Auto Co.....315 S. Second Street, Clinton, Ia.
J. H. Markel.....Nebraska City, Neb.
Osler & Thompson Rubber Co..1245 S. Olive St., Los Angeles, Cal.
Ottumwa Auto Co.....Ottumwa, Ia.
Peavey Rubber Co.....2036 Commerce Street, Dallas, Tex.
Rochester Auto Supply Co.....352 Main Street E, Rochester, N. Y.
Racine Rubber Tire Co. of N. Y....838 Seventh Avenue, New York
St. Louis Rubber & Rep. Co....310 N. Channing Ave., St. Louis, Mo.
Severin Tire & Supply Co....600-602 N. Broadway, Oklahoma City
Simpson & Gibaud Co.....814 Main Street, Buffalo, N. Y.
Standard Tire & Rubber Co....104 Portland Street, Boston, Mass.
Standard-Racine Rubber Co....465 Milwaukee St., Milwaukee, Wis.
L. F. Schoelkopf.....116 South Pinckney Street, Madison, Wis.
J. A. Strimple.....219 East Milwaukee Street, Janesville, Wis.
H. H. Taylor.....211 West 6th Street, Austin, Tex.
O. D. Tucker, IV, & Co.....403 Main Street, Little Rock, Ark.
Tremain & Rankin Auto Co.....Fort Dodge, Ia.
Waterloo Auto Supply Co.....Waterloo, Ia.

RACINE RUBBER COMPANY

RACINE, WISCONSIN



Kelly-Springfield
AUTOMOBILE TIRES

The average mileage of Kelly-Springfield Tires is higher by a thousand or two than the average tire's average mileage. And mileage is the most important thing you buy in tires.

KELLY-SPRINGFIELD TIRE COMPANY

229 W. 57th Street, New York & Akron, Ohio

BRANCHES

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Boston, Mass.	683 Boylston Street
Chicago, Ill.	1200-1202 Michigan Boulevard
Philadelphia, Pa.	208 N. Broad Street
St. Louis, Mo.	3928 Olive Street
Detroit, Mich.	294 Jefferson Avenue
Cincinnati, Ohio	120-122 E. Eighth Street
San Francisco	489 Golden Gate Avenue
Atlanta, Ga.	19 Houston Street
Los Angeles, Cal.	1110 S. Main St.
Cleveland, Ohio	1846 Euclid Avenue
Baltimore, Md.	1421 N. Charles Street
Buffalo, N. Y.	912 Main Street
Seattle, Wash.	515 E. Pike Street
Portland, Ore.	328 Pine Street
Akron, Ohio	Kelly Avenue
Kansas City, Mo.	1515 Grand Avenue

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TOOLS (Continued)

TIRE TOOLS (Continued)

R. & B. Mfg. Co., 5525 Woodland Ave., Philadelphia, Pa. "Jiffy."

RHODES Mfg. Co., S. Division St. & First Ave., Grand Rapids, Mich.

RUDOLF Tire Tool Co., 1007 James St., N. S., Pittsburg, Pa.

S. B. R. Specialty Co., 17-19 Princeton St., East Orange, N. J. "Empire."

SHAWVER Co., rear 31 W. Pleasant St., Springfield, O. "Springfield," "Eclipse."

SMITH & Co., H. D., Plantsville, Conn. "Perfect Handle."

SPRINGFIELD—See Central Brass & Fixture Co.

SPRINGFIELD—See Shawver Co.

STANDARD Welding Co., Cleveland, O. "Stanweld." (See Book Mark.)

STANWELD—See Standard Welding Co.

STAR—See Carlson & Co.

TOBEY, Wm. L., 9 Lewis St. (E. Boston), Boston, Mass.

UNIVERSAL Auto-Tire Remover Co., 948 Market St., San Francisco, Cal.

WALKER-MOORE Mfg. Co., 310 Walker St., Racine, Wis.

WEISER'S E. Z.—See Eastman & Gale.

TIRE VALVE RETHREADING TOOLS

HANSON, Henry L., 25 Union St., Worcester, Mass.

HERCULES—See Wells & Son Co.

NELSON Mfg. Co., A., 564-72 W. Randolph St., Chicago, Ill.

NOONAN Tool & Machine Works, A. S., 130-36 St. James St., Rome, N. Y.

SUPERIOR Tap Co., Charlestown, N. H.

UTILITY—See Wells & Son Co.

WELLS & Son Co., F. E., 45 Ridell St., Greenfield, Mass. "Hercules," "Utility."

VALVE GRINDING TOOLS

(For Valve Grinding Machines—See Machines, Valve Seating)

ASHCROFT Mfg. Co., 119 W. 40th St., New York, N. Y.

ATLAS Machine Co., 110 W. Exchange St., Providence, R. I.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BROWN Co., 213 Bellevue Ave., Syracuse, N. Y.

CLEVELAND Pneumatic Tool Co., 6410 Hawthorne Ave., Cleveland, O.

FLEXIBLE Valve Remover Co., 110 W. Exchange St., Providence, R. I. (See page 473.)

HEALY Tool & Appliance Co., 62-64 Pearl St., Buffalo, N. Y. (See page 419.)

IDEAL Valve Grinder Co., 1127 S. Olive St., Los Angeles, Cal.

JUST Specialty Works, J. H., 325 W. Fayette St., Syracuse, N. Y. "Simplicity."

KELLOGG Mfg Co., Rochester, N. Y. (See page 325.)

LITTLE WONDER—See Smith, Irvin C.

MALLEABLE Iron Fittings Co., Branford, Conn. "Mifco." (See page 485.)

MARTIN Mfg. Co., 511 Vine St., Cincinnati, O. "Monarch."

MERRY, Edward, 395 Allen St., Springfield, Mass.

MIFCO—See Malleable Iron Fittings Co.

MISCH—See Motch & Merryweather Machinery Co.

MONARCH—See Martin Mfg. Co.

MOSSBERG Co., Frank, Attleboro, Mass. (See page 561.)

MOTCH & Merryweather Machinery Co., 707 Lakeside Ave., N. W., Cleveland, O. "Misch."

OLSON Mfg. Co., 2727 O St., Lincoln, Neb.

OWEN—See Stewart & Co.

PERFECT—See Smith Machine Works.

SIMPLICITY—See Just Specialty Works.

SIOUX City Machine & Tool Co., First & Virginia Sts., Sioux City, Ia.

SMITH, Irvin C., 925 Santee St., Los Angeles, Cal. "Little Wonder."

SMITH Machine Works, Winton L., 78 Clinton St., Newark, N. J. "Perfect." (See page 419.)

STEWART & Co., 171 Broadway, New York, N. Y. "Owen."

WALL, J. H., 290 Hope St., Bristol, R. I.

VALVE SEATING OR FACING TOOLS

AMERICAN Developing & Sales Co., Stamford, Conn. "Ideal." (See page 419.)

BRAUNSDORF-MUELLER CO., Elizabeth, N. J.

CRONE, F. G., 334 Genesee St., Buffalo, N. Y.

FOSNACHT—See Paro, H. G.

G. B. Garage & Mfg. Co., Hempstead, N. Y.

HEALY Tool & Appliance Co., 62-64 Pearl St., Buffalo, N. Y. (See page 419.)

IDEAL—See American Developing & Sales Co.

NOONAN Tool & Machine Works, A. S., 129-36 St. James St., Rome, N. Y.

PARO, H. G., 30 N. Michigan Blvd., Chicago, Ill. "Fosnacht."

SARGENT Co., James M., Graniteville, Mass

VALVE SPRING LIFTING TOOLS

ATLAS Machine Co., 110 W. Exchange St., Providence, R. I.

AUTO Forge Sales Co., 80 King Ave., Columbus, O.

BUFFUM Tool Co., Louisiana, Mo.

C. P.—See Clinton Machine Works.

CLINTON Machine Works, 460 High St., Clinton, Mass. "C. P."

DAYTON Malleable Iron Co., Dayton, O.

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

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GAULOIS TIRES
GOAL WAR

Made in France

**"They look better
They wear better
They are better"**

Write for our dealers' proposition.

GAULOIS TIRE Corp.
49 W. 64th St. New York

Canadian Agency
325 St. James St. Montreal

THE PERFECT VALVE GRINDING SET
made especially for FORD motor

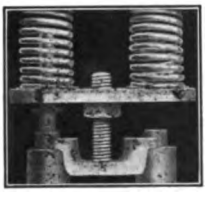
Includes a PERFECT VALVE SPRING LIFTER and all other tools and articles necessary for grinding valves and removing carbon from the Ford motor, also complete instructions for doing the work.

A very practical and useful set for the owner who does his own valve grinding, for less money than the same things would cost bought separately.

If you have a demand for Ford valve lifters and grinders, supply your customers with these, the best tools on the market.

Retail price of complete set...$1.00
Valve spring lifter alone... .50
Valve grinder ..... .15

If your jobber cannot supply you write direct.



THE PERFECT VALVE SPRING LIFTER compresses two springs at once with but a few turns of the nut and holds them up while the valves are being ground. A special lifter made to fit each of the following motors: —1914 Cadillac—1912 to '15 Overland—1909 to '15 Winton —Hupmobile 1912 to '15—1914 & '15 Hudson 40 & 54—1912 to '15 Studebaker 4 & 6 Cyl. 1913 to '15 Haynes 4 & 6 Cyl.

List price $1.50 each
Liberal discount

Winton L. Smith Machine Works
78 CLINTON STREET NEWARK, N. J.

THE IDEAL

ADJUSTABLE

VALVE SEATING & FACING TOOLS

The IDEAL Valve Seating Tool, which is made in two sizes, will reseat all sizes of valves from motorcycle to the largest truck valves.

The IDEAL Valve Facing Tool will reface any size valve.

These tools will be found invaluable to any garage or repair shop.

Write for information and prices.

THE AMERICAN DEVELOPING & SALES CO.
STAMFORD, CONN.

"The Healy Line"
Tools That Cure All Valve Troubles

Valve Reseater
Valve Stem Guide Reamer
Universal Valve Grinder
Valve Spring Lifter

THE HEALY VALVE RESEATER

Dresses all size valves and seats in a few minutes, and takes off all shoulders without removal of manifold or cylinders.

Cuts ANY angle, resharpened in ANY shop, and used by ANY person with perfect safety and accurate results. The cost is saved in using a few times.

Made also in FORD size at a special price.

The PORT STEADY REST is a new feature, gives a bearing ABOVE and eliminates all possibility of chattering

If your dealer can't supply you, write us.
Unconditional guarantee. Good agents wanted.

HEALY TOOL & APPLIANCE CO., Inc.
62-64 Pearl St. Buffalo, N. Y.

New York Office: ASCH & CO. Inc., 1779 Broadway

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TOOLS (Continued)

VALVE SPRING LIFTING TOOLS (Continued)

FAY, W. B., Chicopee Falls, Mass.

FLEXIBLE Valve Remover Co., 110 W. Exchange St., Providence, R. I. (See page 473.)

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco." (See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

HALLBAUER Lifter Co., 1537 Wellston Ave. (Wellston), St. Louis, Mo.

HALLGREN, Carl, 682 Summit Ave., Pasadena, Cal.

HEALY Tool & Appliance Co., 62-64 Pearl St., Buffalo, N. Y. (See page 419.)

HILL—See S. B. R. Specialty Co.

HOADLEY, F. B., 479 Willow St., Waterbury, Conn.

KING Specialty Mfg. Co., 207 Washington St., Brookline, Mass.

KRAEMER—See United States Compass Co.

MECHANICAL & Electrical Mfg. Co., 2225 Prairie Ave., Chicago, Ill. "Triumph."

MERTZ Co., H. B., 1408 Rutherford Ave., Pittsburg, Pa.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Radium." (See page 449.)

MORGAN Mfg. Co., John St., Newport, R. I. "Utility."

MOUND Tool Co., Seventh & Hickory Sts., St. Louis, Mo. (See page 475.)

NATIONAL Jack & Mfg. Co., 130-34 S. Clinton St., Chicago, Ill. "Yarwood."

NOONAN Tool & Machine Works, A. S., 130-36 St. James St., Rome, N. Y.

PERFECT—See Smith Machine Works.

RADIUM—See Milwaukee Auto Specialty Co.

S. B. R. Specialty Co., 17-19 Princeton St., East Orange, N. J. "Hill."

SJOHOLM, N. P., 11 Westmoreland Pl., St. Louis, Mo.

SMITH Machine Works, Winton L., 78 Clinton St., Newark, N. J. "Perfect." (See page 419.)

STANDARD Brass & Iron Works, 1820 St. Paul Ave., Milwaukee, Wis.

TRIUMPH—See Mechanical & Electrical Mfg. Co.

UNITED States Compass Co., Cedarburg, Wis. "Kraemer."

UTILITY—See Morgan Mfg. Co.

VLCHEK Tool Co., 10709 Quincy Ave., Cleveland, O.

YARWOOD—See National Jack & Mfg. Co.

TOPS

AUTOMOBILE TOPS

AMERICAN Auto Trimming Co., 669 Mack Ave., Detroit, Mich.

AMERICAN Top Co., Jackson, Mich. (See page 421.)

AMESBURY Top Co., Cedar St., Amesbury, Mass.

ANDREWS & Eagles Co., E. C., 414-16 Main St., Cambridge, Mass.

ATLANTA Automobile Top & Trimming Co., 755-57 Whitehall St., Atlanta, Ga.

AUTO Cape Top Co., 2334 Michigan Ave., Chicago, Ill.

AUTO Leather Goods Co., 11276 Linden Ave., Stratford, Conn.

AUTO Top Co., 221 E. Columbia St., Fort Wayne, Ind.

AUTO Top & Body Co., Norristown, Pa.

BALTIMORE Buggy Top Co., 107-13 W. Mt. Royal Ave., Baltimore, Md.

BARNES-CURTISS Co., 147-49 W. 99th St., New York, N. Y.

BARTON Auto Top Co., 63-65 Fort St., E., Detroit, Mich.

BIEHLS Auto Top Co., 31 S. Fifth St., Reading, Pa.

BISON Trimming Co., 1183 Jefferson St., Buffalo, N. Y.

BLISS Auto Top Co., C. P., 2308 Walnut St., Denver, Colo.

BLUE Ribbon Auto & Carriage Co., 1720 Fairfield Ave., Bridgeport, Conn.

BOHNET & Co., John, Grand Ave. & Washtenaw St., Lansing, Mich.

BONDY Mfg. Co., 3112 Euclid Ave., Cleveland, O.

BOYER-SCHLISKE Co., 1171 Van Dyke Ave., Detroit, Mich.

BRIGGS Carriage Co., Cedar St., Amesbury, Mass.

BROWNELL & Burt, 12 Washington St., Taunton, Mass.

BUOB & Scheu, 410 Court St., Cincinnati, O.

CADILLAC Auto Painting & Trimming Co., 144-56 Congress St., W., Detroit, Mich. "Universal."

CAPITOL Body Co., Ray St. & Madison Ave., Indianapolis, Ind.

CENTRAL Auto Top Co., 330 N. Illinois St., Indianapolis, Ind.

CHANSLOR & Lyon Top Co., 1208 S. Grand Ave., Los Angeles, Cal.

CHICAGO Carriage & Trimming Co., 1908 Indiana Ave., Chicago, Ill.

CHICAGO Coach & Carriage Co., 1223-31 S. Michigan Ave., Chicago, Ill.

COLLINGS Carriage Co., Front & Arch Sts., Camden, N. J.

COOLING Carriage Co., 402 French St., Wilmington, Del.

COLUMBIA Tire & Top Co., 1014 Commonwealth Ave., Boston, Mass.

CREAM City Trimming Co., 67-71 Juneau Ave., Milwaukee, Wis.

DALLAS Buggy Top Co., 562 Main St., Dallas, Tex.

DECKER Auto Top Co., Beaufait & Charlevoix Sts., Detroit, Mich.

DETROIT Motor Car Supply Co., 1280 Jefferson Ave., Detroit, Mich.

DORL-WILEY Co., 517 Chamber of Commerce, Detroit, Mich. (See page 499.)

DUSTIN Auto Top & Slip Lining Co., 1200 Broadway, Denver, Colo.

Complete Index to Classification appears on Pages 8 to 26.

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American Top Co., JACKSON, MICH.

Manufacturers of

HIGH GRADE AUTOMOBILE TOPS

CAPACITY 500 TOPS PER DAY

Canadian Factory:
Canadian Top Co., Limited
Tilbury, Ont.
CAPACITY 100 TOPS PER DAY

Branch Factory:
Detroit, Michigan

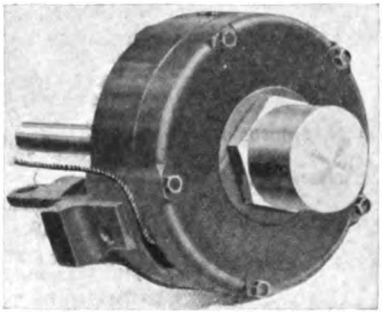
THE MOGUL STARTER

THE MOST POPULAR STARTER ON THE MARKET

Operates with the pedal system. You push the pedal with your right foot and start your engine. The MOGUL is a scientific application of compound leverage. Simple and neat in appearance, it adds much to the value of the car. In size, less than 7 inches in diameter. No expensive batteries. No complicated electric control or switches. No danger from backfire. Looks like an electric starter. Enclosed head. It is purely mechanical in its makeup and always ready. No compressed air to give you trouble.

INSTALLATION

For Ford Cars and other Light Cars add $5.00.



FRONT VIEW OF STARTER

OUR GUARANTEE

The Mogul Starter to be absolutely free from defects in Material and Workmanship, and if properly installed to positively turn the motor of your Automobile. All defective parts will be replaced free of charge for a period of one year, providing such parts are returned to us with all charges prepaid, fully protected by United States Letters Patent.

PRICE

For Ford and Other Cars - $15.00
Light Cars and Cyclecars - $12.50

Prices F. O. B. Chicago

MOGUL STARTER CO.
1329 Michigan Ave., Chicago, Ill.

TOPS, TOP COVERS and WIND SHIELDS BY SPECIALISTS

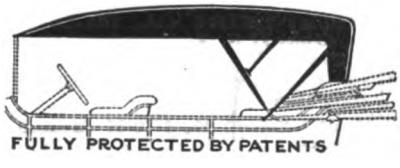
Tops, Top Covers and Wind Shields all bearing the Glover stamp for durability and the Glover smack of smartness—these are our specialties.

Our perfectly equipped plant and our large corps of expert workmen enable us to produce these necessities more cheaply than can any manufacturer.

Send us your specifications.

Glover Equipment Co.
Indianapolis, Ind.

The SHARRER ONE HAND TOP



Can be raised or lowered *with one hand* in less than ten seconds from either the inside or the outside of the car.

To Automobile Manufacturers: We are prepared to supply sockets, assembled frames, complete tops, or will lease shop rights at prices you cannot turn down. Let us quote you.

To Top Manufacturers: We have an interesting proposition for you regarding manufacturing rights.

The SHARRER Top is fully covered by patents and we guarantee to protect you.

Sharrer Patent Top Co., Inc.
245 West 55th St. New York City

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TOPS (Continued)

AUTOMOBILE TOPS (Continued)

ELMWOOD Auto Top & Supply Co., 707 Main Ave., Elmwood Place, O.

ENNIS, W. G., 18 Cumberland St., Charleston, S. C.

EUREKA Co., Rock Falls, Ill.

FALLS City Buggy Top Co., 128-30 S. Floyd St., Louisville, Ky.

FARNHAM & Nelson Co., 47 Union Ave., Boston, Mass.

FEHRING Carriage Co., 601-09 Third St., Columbus, Ind.

FRANK, W. H., 22-24 Harrison St., New Rochelle, N. Y.

GATES Mfg. Co., 530 N. Capitol Ave., Indianapolis, Ind.

GECO—See Glover Equipment Co.

GLOVER Equipment Co., Indianapolis, Ind. "Geco."
(See page 421.)

GOLDE-PATENT Mfg. Co., 509-15 W. 56th St., New York, N. Y.

HAWES Storm Front Co., 14 N. Monroe St., Coldwater, Mich.

HERCULES Rubber Co., 2 Hudson St., New York, N. Y.

HOLBROOK Co., West End Ave. & 67th St., New York, N. Y.

HOLCKER-ELBERG Mfg. Co., Kansas City, Mo.

HOLDEN One-Man Top Co., 1876 Broadway, New York, N. Y.

INDIANA Top & Vehicle Co., Laurenceburg, Ind.

IROQUOIS Auto Top Co., 401-07 Columbia St., Utica, N. Y.

IRVIN Mfg. Co., R. J., Morris & Division Sts., Indianapolis, Ind.

JEWETT Co., Geo. H., 172-74 Shrewsbury St., Worcester, Mass.

KETTERER Co., C. P., 211-15 W. 19th St., New York, N. Y.

KEYSTONE Vehicle Co., Reading, Pa.
(See page 71.)

KINGSBURY-LEAHY Co., 131-33 Hudson Ave., Albany, N. Y.
(See page 71.)

KNAPP Co., A. C., 1735 Mt. Elliott Ave., Detroit, Mich.

KROH Mfg. Co., C. Z., 1212-14 Jackson Ave., Toledo, O.

LA DUE Auto Top Co., 1109 Monroe St., Toledo, O.

LANE, T. W., Amesbury, Mass.

LIMOSETTE—See Mandel Limousine Co.

LONDON Auto Supply Co., 2540-48 Wabash Ave., Chicago, Ill.

LONDON Limousine Co., 112-16 Grove St., Hempstead, N. Y.

LONGDIN & Brugger Co., Fond-du-Lac, Wis.

LOUD, Fred A., Franklin & Lansdowne Sts., Cambridge, Mass.

McDONALD Bros., 1009-11 E. Pike St., Seattle, Wash.

MANDEL Limousine Co., 1445-47 Congress St., Chicago, Ill. "Limosette."

MANHATTAN Top & Body Co., 221-23 W. 64th St., New York, N. Y.

MANN-ALDRICH Carriage Co., 1300 Lincoln St., Denver, Colo.

MATT & Co., F., 491 Washington St., Newark, N. J.

MILWAUKEE Trimming Co., 549 E. Water St., Milwaukee, Wis.

MONAHAN Vehicle Co., Kinsley Ave. & Eagle St., Providence, R. I.

MOUNT Co., J. W., Maple Ave. & White St., Red Bank, N. J.

MURRAY & Co., P. A., Newton, Mass.

NATIONAL Auto Top Co., 1621 W. Broad St., Richmond, Va.

NEWTON & Son, W. H., 127 Elm St., Cortland, N. Y.

NOVELTY Carriage Works, 815-17 Second Ave., Spokane, Wash.

OHIO Top Co., 909-11 Broadway, Cincinnati, O.

OMAHA Auto Top Co., 709-11 S. 15th St., Omaha, Neb.

PEERLESS Buggy Top Co., York St. & Central Ave., Cincinnati, O.

PERKINS Campbell Co., 634 Broadway, Cincinnati, O.
(See page 48.)

PLUMSTEAD & Son, M., 614-26 Washington St., Lynn, Mass.

REARDON, J. J., Clark St., Amesbury, Mass.

ROSS & Browne, 6127-29 Cottage Grove Ave., Chicago, Ill.

RUCH Auto Top Co., Third & Sidney Aves., Mt. Vernon, N. Y.

RUDD Auto Top Co., 46 Bagg St., Detroit, Mich.

ST. LOUIS Top Co., 3025-29 Olive St., St. Louis, Mo.

SCHILDWACHTER Carriage Co., Park Ave. & 128th St., New York, N. Y.

SCHREIBER Carriage Mfg. Co., Chariton, Ia.

SCHUBERT Bros. Gear Co., 43 Cedar St., Oneida, N. Y.

SHARRER Patent Top Co., 245 W. 55th St., New York, N. Y.
(See page 421.)

SHIELDS Carriage Co., 11 Carriage Ave., Amesbury, Mass.

SIEDER Mfg. Co., 31-33 E. Woodbridge St., Detroit, Mich.

SIMON Auto Top Mfg. Co., S., 310 E. 17th St., Kansas City, Mo.

SNOW-MOSS Co., 147 W. 33d St., New York, N. Y.

SPRINGFIELD Auto Top & Upholstering Co., 224-30 Dwight St., Springfield, Mass.

SPRINGFIELD Harness Co., 55-61 Dwight St., Springfield, Mass.

SPRINGFIELD Metal Body Co., Springfield, Mass.
(See page 69.)

STANDARD Top Co., (Kingston), Wilkes-Barre, Pa.

STANDARD Top & Equipment Co., 1212 Huron Rd., Cleveland, O.

STERLING Auto Top Co., Detroit, Mich.

STERLING Top & Equipment Co., 518-22 W. 57th St., New York, N. Y.

STONE & Sons, C., 1658-74 Ogden Ave., Chicago, Ill.

STORM Buggy & Auto Top Co., Fostoria, O.

SUGNET, Geo. W., 297-301 Oak St., Buffalo, N. Y.

Complete Index to Classification appears on Pages 8 to 26.

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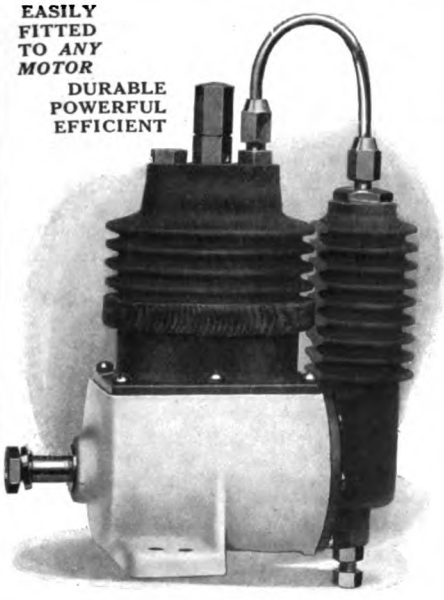
The "M-P" Motor Tire Pump

EASILY FITTED TO *ANY MOTOR*
DURABLE
POWERFUL
EFFICIENT



FILLS YOUR TIRES IN FIFTEEN SECONDS

Can be used on any type of Motor Car

LARGE or SMALL

THE "M-P" TIRE PUMP is Standard Equipment on such cars as the "Cadillac," etc.

OUR PUMP may also be attached to any electrical motor, and be moved about in any garage to fill tires wherever necessary. We will supply pump and 12 feet of hose with connections. You supply motor, board and wheels.

We want dealers not only to handle our **pump,** but also **cyclecars, carburetors, spark plugs** and other **accessories.**

NATIONAL UNITED SERVICE CO.
DETROIT, MICH

BUNTING BRONZE BUSHINGS

reach you completely machined, ready for assembling—and save you 25 to 100%.

We have proven this statement to the complete satisfaction of more than 250 concerns who are using Bunting Bushings and Bearings.

Our position is unique in the industry, and that fact means something tangible to our customers. We make nothing but bushings and bearings—have been making bushings and bearings for a goodly number of years—and we say, with perfect confidence in our ability to help you, that *we make them well;* that we know the business from top to bottom and are thus able to save money for our customers.

Furthermore, Bunting Phosphor Bearing Bronze is the highest grade bearing metal possible to procure. That's another of the reasons for Bunting superiority. (We use your own composition if you prefer.)

FOR EVERY BUSHING USE

Manufacturers of automobiles, automobile parts, motors, use Bunting Bushings to best advantage.

We have issued a new "Bronze Bushing Catalog" which is a valuable *reference book* to the man who uses this kind of material. Glad to send it to any manufacturer. Ask for "Price-list C." It will tell you more about this line that is today in use in every state in the Union. This catalog, listing prices in 100 and 1000 lots, shows

1248 Standard Sizes—others to order.

If you should want a bushing that we don't list, we can make it. (Send Specifications.) And get this catalog anyway—have it handy.

The Bunting Brass and Bronze Company
737 Spencer Street, Toledo, Ohio

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TOPS (Continued)

AUTOMOBILE TOPS (Continued)

THOMPSON Co., E. J. (Forbes Field), Pittsburg, Pa.

TOPFORD Detachable Limousine Co., 1700 Broadway, New York, N. Y.

UNION Top Mfg. Co., 346 Collins Ave., Pittsburg, Pa.

UNIVERSAL—See Cadillac Auto Painting & Trimming Co.

VALENTINE, J. S., 432-38 Princeton Ave., Trenton, N. J.

VEHICLE Top & Supply Co., 3414 Lindell Ave., St. Louis, Mo. "Vesco."

VESCO—See Vehicle Top & Supply Co.

VETTER Auto Top Co., 95-97 West End Ave., New York, N. Y.

WALKER & Co., Alfred J., 223 W. 66th St., New York, N. Y.

WARDEN Co., Geo. J., 6530-34 Carnegie Ave., Cleveland, O.

WARNER Auto Top Co., 1646-50 Central Ave., Cincinnati, O.

WAYNESBURG Carriage Co., Waynesburg, O.

WEBER Co., M., 218-20 N. St. Clair St., Dayton, O.

WERNER & Sons, Geo., 1133-37 Main St., Buffalo, N. Y.

WILSON Co., J. C., 15th & Warren Aves., Detroit, Mich.

WOLVERINE Winter Top Co., 6 Elizabeth St., W. Detroit, Mich.
(See page 647.)

WRIGHT & Co., C. E., Norfolk, Va.

TRAILERS

AUTOMOBILE AND TRUCK TRAILERS

CAMPBELL Mfg. Co., Jackson, Mich.

DETROIT Trailer Co., 90 E. Woodbridge St., Detroit, Mich.

DUNKLEY Co., Kalamazoo, Mich.

SHADBOLT Mfg. Co., Flushing Ave. & Cumberland St., Brooklyn, N. Y.

SHERWOOD Bros. Mfg. Co., 440 Main St., Canastota, N. Y.

SIMPLEX Short-Turn Gear Co., W. Third St., Anderson, Ind.

TROY Wagon Works Co., Troy, O.

TRANSFERS

DECALCOMANIA TRANSFERS

MEYERCORD Co., Chamber of Commerce Bldg., Chicago, Ill.

NATIONAL Decalcomania Co., 238-40 N. 60th St., Philadelphia, Pa.

PALM, Fechteler & Co., 67 Fifth Ave., New York, N. Y.

TREADS

DETACHABLE TIRE TREADS OR PROTECTORS

ARTILLERY Auto Tire Protector Co., First National Bank Bldg., Pittsburg, Pa.

A. S. B.—See Queen Mfg. Co.

BRICTSON Mfg. Co., Brookings, S. D.

BUFFALO Rubber Mfg. Co., Sussex Ave. & Erie R. R., Buffalo, N. Y.

COLORADO Tire & Leather Co., 1340 Acoma St., Denver, Colo. "Durable."

DAVIS Robe & Armor Co., 8 N. State St., Chicago, Ill.

DURABLE—See Colorado Tire & Leather Co.

ECONOMY Tread Co., 113 Lenox Ave., New York, N. Y.

GOODYEAR Tire & Rubber Co., Akron, O.

INVINCIBLE—See Sturges Co.

INVINCIBLE Tire Co., 53 Sabin St., Providence, R. I.

KIMBALL Tire Case Co., 168 Broadway, Council Bluffs, Ia.

KING Tire Protector Co., Matthews Bldg, Milwaukee, Wis.

LEATHER Tire Goods Co., Niagara Falls, N. Y. "Woodworth."
(See page 431.)

MANSFIELD Tire & Rubber Co., Newman St., Mansfield, O.

MAPLEBAY Mfg. Co., Crookston, Minn.

MILLER, Chas. E., 1400 S. Meridian St., Anderson, Ind.

PACIFIC—See Sturges Co.

QUEEN Mfg. Co., Webster City, Ia. "A. S. B."

SAMPSON Tire Protector Mfg. Co., Grand Island, Neb.

SLAMA Tire Protector Co., 1504 Grand Ave., Kansas City, Mo.

STURGES Co., V. K., 239-12th St., Oakland, Cal. "Invincible," "Pacific," "Zig-Zag."

TRIPLE Tread Mfg. Co., 1545 Michigan Ave., Chicago, Ill.

TWENTIETH Century Tire Protector Co., Midlothian, Tex.

UNIVERSAL Tire Protector Co., Angola, Ind.

WOODWORTH—See Leather Tire Goods Co.

X X X Auto Accessory Co., Springfield, Mass.

ZIG-ZAG—See Sturges Co.

TREATING

HEAT TREATING

AMERICAN Metal Treatment Co., Elizabeth, N. J.
(See page 135.)

BIDLE Co., W. S., Cleveland, O.

BRIDGEPORT Metal Treating Co., 125 Stratford Ave., Bridgeport, Conn.

SCOTT, C. U., head of Wall St., Davenport, Ia.

WYMAN & Gordon Co., Worcester, Mass.
(See Back Bone.)

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ANTI-FRICTION

A bearing Bronze which DOES NOT CUT

Cored Bars and *Solid Rods* in a variety of sizes suited to the requirements of the repair shop and manufacturer.

"HECLA" BRONZE possesses those properties so essential to a metal used for bearing purposes.

It DOES NOT CUT **It will not POUND OUT or BREAK**
It machines at a LOW COST

Bearings of this material have a reputation for long life and freedom from friction. The convenient form in which it is stocked appeals to the repairman.

"HECLA" BRONZE is not the lowest priced bearing bronze and there are other bronzes priced much higher. Irrespective of price per pound, you will find this material the most economical, all points considered.

The composition of this bronze is UNIFORM at all times. Only the best materials are used in producing the alloy.

We make the claim emphatically, that "HECLA" BRONZE has *no superior*, regardless of price.

Castings and *machined parts* will be furnished from your patterns or sketches.

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D.W. F. STEEL BALLS—Accurate to *within* 1/10,000″
FOR HIGHEST CLASS OF AUTOMOBILE WORK, ETC.

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HIGH SPEED—ALLOY—CARBON—CHROME NICKEL—NICKEL, ETC.
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Sole American Agents—HANS RENOLD DRIVING CHAINS

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TRIMMINGS

CLOTH AND CARPET TRIMMINGS

(See also Broadcloth; also Buttons; also Carpet; also Cloth; also Lace; also Linoleum; also Silk; also Whipcord)

ALF Co., Edward F., 420 E. Eighth St., Cincinnati, O.

BARRELL Co., Wm. L., 8 Thomas St., New York, N. Y.

BRIDGEPORT Coach Lace Co, 1731-37 Broadway, New York, N. Y.
(See page 153.)

CARR Co., F. S., Boston, Mass.
(See page 123.)

CHANDLER Oil Cloth & Buckram Co., East Taunton, Mass.

CHASE & Co., L. C., Boston, Mass.
(See page 317.)

CHRISTIE, Alex, 1100 E. Pike St., Seattle, Wash.

DUSENBURY & Co., Louis, 222 Fourth Ave., New York, N. Y.

FINE Woolen Co., 58-60 Worth St., New York, N. Y.

GALLAND, Wechmar & Co., 456 Fourth Ave., New York, N. Y.

GERHAB, Jacob, 158-64 N. Third St., Philadelphia, Pa.

GIFFORD & Son, John A., 25 Park Pl., New York, N. Y.

HAARTZ, J. C., Boston, Mass.

HOOF Co., C. M., 317 W. Randolph St., Chicago, Ill.

HORSTMANN Co., Wm. H., Fifth & Cherry Sts., Philadelphia, Pa.

KENNEDY, Willing & Co., 526 Arch St., Philadelphia, Pa.

LAIDLAW Co., New York, N. Y.
(See page 537.)

LANDERS Bros. Co., Dept. A, Toledo, O.
(See page 427.)

LOUNSBERY & Sons, G. H., 107-09 W. Third St., Cincinnati, O.

MOSSMAN, Yarnelle & Co., Pearl St. & Maiden Lane, Fort Wayne, Ind.

MUTTY Co., L. J., Boston, Mass.
(See page 239.)

NORRIS & Sons, R. W., 342-48 N. Gay St., Baltimore, Md.

PARRY & Co., A. N., Amesbury, Mass.

PATTERSON & Greenough, 45 E. 17th St., New York, N. Y.

PIER-ROBERTSON-RAINEY Co., 108 S. Howard St., Baltimore, Md.

ROEHM & Davison, Woodbridge & Wayne Sts., Detroit, Mich.

ROGERS & Co., E. F., 410 Arch St., Philadelphia, Pa.

SCHERER & Co., H., Detroit, Mich.

SCHLEGEL Mfg. Co., College Ave. & N. Goodman St., Rochester, N. Y.

SHERWOOD, A. S., 754-56 Seventh Ave., New York, N. Y.

SHIRLEY Auto Fabric Co., 38-40 W. 32d St., New York, N. Y.

SLOANE, W. & J., Fifth Ave. & 47th St., New York, N. Y.

TEN EICK, Cornelius, 258 W. 47th St., New York, N. Y.

TIEL & Co., Geo., 418 Arch St., Philadelphia, Pa.

VOGT Mfg. & Coach Lace Co., 408-10 St. Paul St., Rochester, N. Y.

WIESE & Co., Wm., 234 W. 55th St., New York, N. Y.

METAL TRIMMINGS

(See also Fasteners, Curtain; also Fittings, Top: also Forgings, Drop; also Handles, Door; also Hinges, Door; also Locks, Door; also Irons, Slat; also Irons, Top; also Mouldings, Brass; also Rests, Bow; also Separators, Bow)

AMESBURY Brass & Foundry Co., Amesbury, Mass.

ATTWOOD Brass Works, Scribner Ave. & Bowery St., Grand Rapids, Mich.
(See page 249.)

CHICAGO-RACINE Aluminum, Brass & Iron Works, 224-30 W. Huron St., Chicago, Ill.

COWLES & Co., C., New Haven, Conn.
(See page 87.)

DOUGLAS & Lomason Co., Detroit, Mich.
(See page 211.)

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

ENTERPRISE Brass & Plating Co., 2838-44 Spring Grove Ave., Cincinnati, O.

HIGGIN Mfg. Co., Newport, Ky.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
(See page 83.)

METAL Stamping Co., 13th St. & Boulevard, Long Island City, N. Y.

MONARCH Carriage Goods Co., 2838-44 Spring Grove Ave., Cincinnati, O.

PHOENIX Lock Works, 821-27 Third Ave., Newark, N. J.

SHERWOOD, A. S., 754-56 Seventh Ave., New York, N. Y.

SMITH & Co., Jos. N., Detroit, Mich.
(See page 547.)

TAYLOR Co., H. D., 101-05 Oak St., Buffalo, N. Y.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill.
(See page 293.)

WHITE Mfg. Co., 155 Cannon St., Bridgeport, Conn.

WING Co., Charles, Amesbury, Mass.
(See page 399.)

WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn.

TRUCKS

REPAIR TRUCKS

(For lying on when making repairs underneath a car)

AUTO Folding Sub-Car Co., 222 W. Muskingum Ave., Zanesville, O.

AUTO. & Accessories Mfg. Co., 816 W. North Ave., Baltimore, Md. "Norwood."

BROWN Co., 213 Bellevue Ave., Syracuse, N. Y.

E-Z ROLLER—See Rice & Dayton Mfg. Co.

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Landers goods always satisfy, shipments are prompt—prices low. Our years of experience gives us an "inside" on things and you get the benefit. Numbered among our customers are many prominent factories. We can help you with your problems and serve you with the following items:

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Transparent Celluloid	WEBBING	Oiled Duck Sheeting
Fiber Cord	MOHAIR,	Duck
Wadding	STRAIN STRAPS,	Cushion Canvas
Imitation Leather	TOP MATERIAL	Bow Lining
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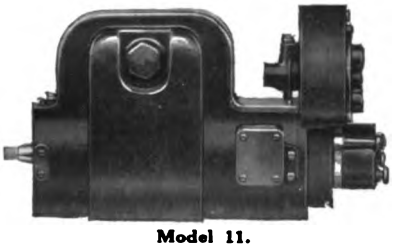

Model 11.

The Model 11 Combined Lighting and Ignition Generator can be easily installed on the present magneto base and the same drive utilized.

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TRUCKS (Continued)

REPAIR TRUCKS (Continued)

FAW, J. H., 41 Warren St., New York, N. Y.

FRENCH, F. A., Braddock Ave. & Guthrie St., Pittsburg, Pa. "Getunder."

GETUNDER—See French, F. A.

HERCULES—See La Porte Mat & Mfg. Co.

IDEAL—See Lewis-Geer Mfg. Co.

IDEAL Sheet Metal Works, 2809 Michigan Ave., Chicago, Ill. (See page 331.)

KEYSTONE Wire Matting Co., Beaver Falls, Pa.

LA PORTE Mat & Mfg. Co., La Porte, Ind. "Hercules."

LEWIS-GEER Mfg. Co., Ypsilanti, Mich. "Ideal"

MASCO—See Milwaukee Auto Specialty Co.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Masco." (See page 449.)

NORWOOD—See Auto. & Accessories Mfg. Co.

RICE & Dayton Mfg. Co., 115-19 E. Fourth St., Cedar Falls, Ia. "E-Z Roller."

SIMPLEX Auto Specialty Co., 733 Woodward Ave., Detroit, Mich.

FITZGERALD Trunk Co., 1214 Wells St., Chicago, Ill.

FULLER Co., G. W., 182-84 Asylum St., Hartford, Conn.

HASKELL Bros., 109 N. Wabash Ave., Chicago, Ill.

INDESTRUCTO—See National Veneer Products Co.

KAMLEE Co., 247 Broadway, Milwaukee, Wis.

KING, W. A., 52 Public Sq., Cleveland, O.

KRONAUER & Co., Chas., 152 N. Desplaines St., Chicago, Ill.

MORRISON & Co., L. E., 27 W. Washington St., Indianapolis, Ind.

NATIONAL Veneer Products Co., Mishawaka, Ind. "Indestructo."

PLANET Co., Westfield, Mass. "Duplex."

SAGE'S Trunk & Leather Goods Co., 134 Summer St., Boston, Mass.

STALLMAN, F. A., 57 E. Spring St., Columbus, O.

TAYLOR Trunk Works, C. A., 39 E. Randolph St., Chicago, Ill.

TUTTLE & Clark, Jefferson & Bates Sts., Detroit, Mich.

WARREN Leather Goods Co., 80 Austin St., Worcester, Mass.

WINSHIP, W. W., 71 Summer St., Boston, Mass.

TRUCKS AND CASTORS

WRECKING TRUCKS AND CASTORS

HOLMES & Bros., Robt., 40 N. Hazel St., Danville, Ill.

LAWSON—See Menasha Wood Split Pulley Co.

MENASHA Wood Split Pulley Co., Menasha, Wis. "Lawson."

RUB-ON Mfg. Co., 89 Brayton St., Buffalo, N. Y.

WEAVER Mfg. Co., Springfield, Ill.

TRUNKS

LEATHER, FABRIC AND BOARD TRUNKS

AJAX Trunk & Sample Case Co., 91-93 Mercer St., New York, N. Y.

ATCO—See Auto Trunk Mfg. Co.

AUTO Trunk Mfg. Co., 94 Reade St., New York, N. Y. "Acto."

BAILEY Co., R. B., 406 W. Pico St., Los Angeles, Cal.

BAL, Wm., 14 Johnston St., Newark, N. J.

BELBER Trunk & Bag Co., 1641 N. Hancock St., Philadelphia, Pa.

BERG Auto Trunk & Specialty Co., 400 Lafayette St., New York, N. Y.

BOYLE & Co., John, 112-14 Duane St., New York, N. Y.

DUPLEX—See Planet Co.

FARMERS Market Co., 711 Orange St., Wilmington, Del.

METAL TRUNKS

A-Z Co., 530 W. 56th St., New York, N. Y.

IMPERIAL—See Welch & Suthergeren Co.

NATIONAL Enameling & Stamping Co., 374-78 Broadway, New York, N. Y. "Nesco."

NESCO—See National Enameling & Stamping Co.

WELCH & Suthergreen Co., 80 Lunenburg St., Fitchburg, Mass. "Imperial."

TUBES

INNER TUBES

(For Complete Tires—See Tires, Pneumatic)

ACME Rubber Mfg. Co., Trenton, N. J.

AMERICAN Tire & Rubber Co., 70-78 Beach St., Akron, O.

BATAVIA Rubber Co., Batavia, N. Y.

BLODGETT Rubber Co., St. Joseph, Mich.

BRAENDER Rubber & Tire Co., Rutherford, N. J. (See page 429.)

BRIARCLIFF—See Century Rubber Co.

BROWN Scientific Tube Co., Broadway & 72d St., New York, N. Y.

BUCYRUS Rubber Co., Bucyrus, O.

BUFFALO Rubber Mfg. Co., Sussex Ave. & Erie R. R., Buffalo, N. Y.

BULL DOG—See Morgan & Marshall Rubber & Tire Co.

CENTURY Rubber Co., Plainfield, N. J. "Briarcliff," "Knickerbocker," "Netherwood."

COMBINATION Rubber Mfg. Co., Bloomfield, N. J.

CONTINENTAL Rubber Works, Erie, Pa. "Vitalic."

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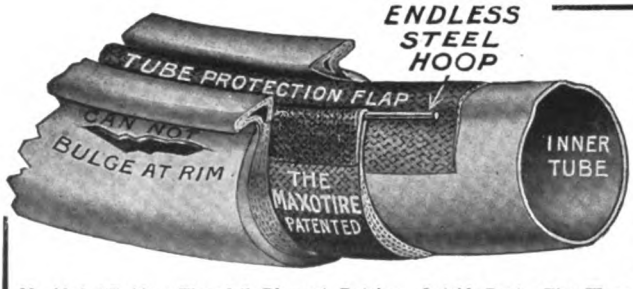

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TUBES (Continued)

INNER TUBES (Continued)

CONVERSE Rubber Shoe Co., Malden, Mass. "Tuff-E-Nuff."

COURTNEY, W. J., 1731 Broadway, New York, N. Y.

DAYTON Rubber Mfg. Co., 1204 Kiser St., Dayton, O.
(See page 415.)

DE LUXE—See Thermoid Rubber Co.

DIAMOND Rubber Co., Akron, O.

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J.

ENDURANCE Tire & Rubber Co., New Brunswick, N. J.

ENGLEBERT Tyre Co., 1928 Broadway, New York, N. Y. (Importers).

FALLS Rubber Co., Cuyahoga Falls, O.

FEDERAL Rubber Mfg. Co., Milwaukee, Wis.

FELLSEN Tire Co., 1995 Broadway, New York, N. Y.

FIRESTONE Tire & Rubber Co., Akron, O.

FISK & Dunham Rubber Co., American Mechanics Bldg., Trenton, N. J.

FISK Rubber Co., Chicopee Falls, Mass.

FRONTIER Tire & Rubber Co., 1054 Main St., Buffalo, N. Y.

GAULOIS Tire Corp., 49 W. 64th St., New York, N. Y. (Importers.)
(See page 419.)

GLOBE—See United & Globe Rubber Mfg. Cos.

GOODRICH Co., B. F., Akron, O.

GOODYEAR Tire & Rubber Co., Akron, O.

GORDON Rubber Co., Canton, O.

GREAT Eastern Rubber Co., 1027 Hamilton St., Allentown, Pa. "Premier."

GREENSBURG Tire & Rubber Co., W. Otterman and Depot Sts., Greensburg, Pa. "Isbest," "Pyramid," "Red Wing," "Silver Grey."

HAMILTON Rubber Mfg. Co., Trenton, N. J. "Perfection."
(See page 359.)

HELIX Tube Co., 1733 Broadway, New York, N. Y.

HOME Tire Co., Trenton, N. J.

HOOD Rubber Co., Watertown, Mass.
(See page 429.)

HOWE Rubber Co., New Brunswick, N. J.

IDEAL—See Voorhees Rubber Mfg. Co.

IMPERIAL—See McGraw Tire & Rubber Co.

INDIANA Rubber & Insulated Wire Co., Jonesboro, Ind.

ISBEST—See Greensburg Tire & Rubber Co.

KEYSTONE Rubber Mfg. Co., 125-41 E. 11th St., Erie, Pa.

KNICKERBOCKER—See Century Rubber Co.

KNIGHT Tire & Rubber Co., Canton, O.

KOKOMO Rubber Co., Kokomo, Ind.

L. & M. Rubber Co., Chicago, Ill.

LEE Tire & Rubber Co., Conshohocken, Pa. "Velvet."

McGRAW Tire & Rubber Co., East Palestine, O. "Imperial."
(See page 413.)

MANHATTAN Rubber Mfg. Co., Passaic, N. J.

MANSFIELD Tire & Rubber Co., Newman St., Mansfield, O.

MARATHON Tire & Rubber Co., Front St., Cuyahoga Falls, O.

MATTSON Rubber Co., Lodi, N. J.
(See page 291.)

MICHELIN Tire Co., Milltown, N. J.

MIDGLEY Tire & Rubber Co., Lancaster, O.
(See page 415.)

MILLER Rubber Co., Akron, O.

MILTON Tire & Rubber Co., 326 A St. (S. Boston), Boston, Mass.

MODEL—See Voorhees Rubber Mfg. Co.

MOHAWK Rubber Co., Akron, O.

MORGAN & Marshall Rubber & Tire Co., East Liverpool, O. "Bull Dog."

NASSAU—See Thermoid Rubber Co.

NETHERWOOD—See Century Rubber Co.

NEW Jersey Car Spring & Rubber Co., Wayne & Brunswick Sts., Jersey City, N. J.

NORTHLAND Rubber Co., 703-11 Northland Ave., Buffalo, N. Y. "Red Jacket."

PACKARD—See Pharis Tire & Rubber Co.

PATTERSON Rubber Co., Lowell, Mass.

PENNSYLVANIA Rubber Co., Jeannette, Pa.

PERFECTION—See Hamilton Rubber Mfg. Co.

PERFECTION Auto Tube Co., 1622 Broadway Denver, Colo.

PHARIS Tire & Rubber Co., W. Main St., Newark, O. "Packard."

PORTAGE Rubber Co., Akron, O.

PREMIER—See Great Eastern Rubber Co.

PYRAMID—See Greensburg Tire & Rubber Co.

QUAKER City Rubber Co., 629 Market St., Philadelphia, Pa.

RACINE Rubber Co., Racine, Wis.
(See page 417.)

RED JACKET—See Northland Rubber Co.

RED WING—See Greensburg Tire & Rubber Co.

REPUBLIC Rubber Co., Youngstown, O.

ROME Hollow Wire & Tube Co., Rome, N. Y.

RUTHERFORD Rubber Co., Rutherford, N. J. "Sterling."

SAVAGE Tire Co., Main & Sicard Sts., San Diego, Cal.

SEAMLESS Rubber Co., New Haven, Conn.

SEDRALA—See Semple Rubber Co.

SEMPLE Rubber Co., 112 Murray St., Trenton, N. J. "Sedrala."

SILVER GREY—See Greensburg Tire & Rubber Co.

SLADE Mfg. Co., Providence, R. I.

STERLING—See Rutherford Rubber Co.

TEN Broeck Tyre Co., 840 S. 26th St., Louisville, Ky.

THERMOID Rubber Co., Trenton, N. J. "De Luxe," "Nassau."
(See page 57.)

TRIPLEX Tube Co., 60 State St., Boston, Mass.

TUFF-E-NUFF—See Converse Rubber Shoe Co.

TYER Rubber Co., Andover, Mass. "Tyrian."

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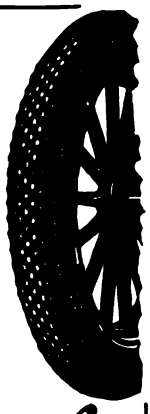

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Has more valuable and up-to-date features than any other instrument at any price; namely:
Indicates accurately speeds from zero up.
Can be attached to either wheel.
Indicates speed and mileage when backing.
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It is equipped with our universal pivot joint.
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4 "	60 "	$40.00	4 "	" "	$90.00

Standard Thermometer Co., 65 Shirley St., Boston, Mass.
Successors to Parker Mfg. Co.

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TUBES (Continued)

INNER TUBES (Continued)

TYRIAN—See Tyer Rubber Co.

UNITED States Tire Co., Broadway & 58th St., New York, N. Y.

UNITED & Globe Rubber Mfg. Cos., Trenton, N. J. "Globe."

VELVET—See Lee Tire & Rubber Co.

VICTOR Rubber Co., Springfield, O.

VOORHEES Rubber Mfg. Co., 18-46 Bostwick Ave., Jersey City, N. J. "Model," "Ideal."
(See page 291.)

VITALIC—See Continental Rubber Works.

ZEE Zee Tire & Rubber Co., 33d & Walnut Sts., Philadelphia, Pa.

SPEAKING TUBES

(For Limousine Telephones—See Telephones, Limousine: For Annunciators—See Annunciators)

BRIDGEPORT Coach Lace Co., 1731-37 Broadway, New York, N. Y.
(See page 153.)

COLUMBIA—See Horstmann Co.

COWLES & Co., C., New Haven, Conn.
(See page 87.)

ENGLISH & Mersick Co., 154-60 Winchester Ave., New Haven, Conn.

HORSTMANN Co., Wm. H., Fifth & Cherry Sts., Philadelphia, Pa. "Columbia."

LAW Engineering & Specialty Mfg. Co., Rochester, N. Y.

PERPENTE Mfg. Co., State & Wall Sts., New Haven, Conn.

SCHLEGEL Mfg. Co., College Ave. & N. Goodman St., Rochester, N. Y.

TAYLOR Co., H. D., 101-05 Oak St., Buffalo, N. Y.

TUBING

ALUMINUM TUBING

ALUMINUM Co. of America, Pittsburg, Pa.

IVINS Tube Works, Elwood, Oak Lane Station, Philadelphia, Pa.

BRASS AND COPPER TUBING

AMERICAN Brass Co. (Ansonia Brass & Copper Branch), Ansonia, Conn.

AMERICAN Brass Co. (Benedict & Burnham Branch), Waterbury, Conn.

AMERICAN Brass Co. (Coe Brass Branch), Torrington, Conn.

AMERICAN Brass Co. (Kenosha Branch), Kenosha, Wis.

BARCALO Mfg. Co., Buffalo, N. Y.
(See page 563.)

BRIDGEPORT Brass Co., P. O. Station L., Bridgeport, Conn.
(See page 323.)

CHASE Rolling Mill Co., Waterbury, Conn.

CORNELIS & Gridley, Wolcott St., Waterbury, Conn.

DETROIT Copper & Brass Rolling Mills, Clark Ave. below Wabash R. R., Detroit, Mich.

ERIE-BUFFALO Tube Co., 18th & Cranberry Sts., Erie, Pa.
(See page 433.)

FRENCH Mfg. Co., 142 Robbins St., Waterbury, Conn.

HORN Co., M. T., 82-86 Park Pl., New York, N. Y.

IVINS Tube Works, Elwood, Oak Lane Station, Philadelphia, Pa.

MACKENZIE-WALTON Co., Pawtucket, R. I.

MICHIGAN Copper & Brass Co., 1611 Jefferson Ave. W., Detroit, Mich. "Wolverine."

NATIONAL Brass & Copper Tube Co., 41 Park Row, New York, N. Y.

NEW Jersey Tube Co., Newark, N. J.

RANDOLPH-CLOWES Co., Waterbury, Conn.

ROME Brass & Copper Co., Rome, N. Y.

ROME Hollow Wire & Tube Co., Rome, N. Y.

STANDARD Brass & Copper Tube Co., Woodbridge & Division Sts., New London, Conn.

UNIFORM Seamless Wire Co., 71 Peck St., Providence, R. I.

UNITED Wire & Supply Co., 109 Summer St., Providence, R. I.

WATERBURY Mfg. Co., Waterbury, Conn.

WELLS & Co., A. H., Watertown Rd., Waterbury, Conn.

WOLVERINE—See Michigan Copper & Brass Co.

COPPER TUBING

(See Tubing, Brass and Copper)

FIBRE TUBING

(See Fibre, Hard)

FLEXIBLE METALLIC TUBING

ADVANCE—See Interlocked Metallic Hose Co.

ALMOND Mfg. Co., T. R., 1 Maple Ave., Ashburnham, Mass.
(See page 537.)

AMERICAN Metal Hose Co., Waterbury, Conn.

ATLANTIC Tubing Co., 1756 Cranston St., Providence, R. I.

AUTOMOBILE Supply Mfg. Co., 220 Taaffe Pl., Brooklyn, N. Y. "Rubes."

BREEZE Carbureter Co., 250-52 South St., Newark, N. J.

CHICAGO Tubing & Braiding Co., 216-24 N. Clinton St., Chicago, Ill.

COATES Clipper Mfg. Co., 237 Chandler St., Worcester, Mass.

DUOFLEX—See Fischer Spring Co.

FISCHER Spring Co., Chas., 88-90 Walker St., New York, N. Y. "Duoflex."

INTERLOCKED Metallic Hose Co., Orchard & Scott Sts., Newark, N. J. "Advance."

LOMBARDI Motor Car Co., 67-71 Minerva St., Derby, Conn.

METAL Hose & Tubing Co., 17 Battery Pl., New York, N. Y. "Triplexd."
(See page 525.)

PENNFLEX—See Pennsylvania Flexible Metallic Tubing Co.

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for all special purposes.

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TUBING (Continued)

FLEXIBLE METALLIC TUBING (Continued)

PENNSYLVANIA Flexible Metallic Tubing Co., Broad & Race Sts., Philadelphia, Pa. "Pennflex."

RILEY-KLOTZ Mfg. Co., 17 Mulberry St., Newark, N. J.

RUBES—See Automobile Supply Mfg. Co.

STANDARD Metal Mfg. Co., Newark, N. J. (See page 219.)

TRIPLEXD—See Metal Hose & Tubing Co.

U. S. Flexible Metallic Tubing Co., 450 E. Third St., Los Angeles, Cal.

UNIVERSAL Flexible Conduit Co., 109 Tichenor St., Newark, N. J.

WEBB Mfg. Co., ft. Center St., Newark, N. J. (See page 483.)

HARD RUBBER TUBING

(See Rubber, Hard)

IRON-LINED BRASS TUBING

PHENIX Tube Co., 182 N. 11th St., Brooklyn, N. Y.

ROME Mfg. Co., Railroad St., Rome, N. Y.

SOFT RUBBER TUBING

ACME Rubber Mfg. Co., Trenton, N. J.

ATLANTIC Tubing Co., 1756 Cranston St., Providence, R. I.

BOSTON Belting Co., 84 Linden Park St., Boston, Mass.

BOSTON Woven Hose & Rubber Co., 110 Portland St., Cambridge, Mass.

BOWERS Rubber Works, 68-70 Sacramento St., San Francisco, Cal.

CANFIELD Rubber Co., Bridgeport, Conn.

CINCINNATI Rubber Mfg. Co., Cincinnati, O. (See page 369.)

COMBINATION Rubber Mfg. Co., Bloomfield, N. J.

CONTINENTAL Rubber Works, Erie, Pa.

DIAMOND Rubber Co., Akron, O.

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J.

ESSEX Rubber Co., Trenton, N. J.

FEDERAL Rubber Mfg Co., Milwaukee, Wis.

GOODRICH Co., B. F., Akron, O.

HAMILTON Rubber Mfg. Co., Trenton, N. J. (See page 359.)

HODGMAN Rubber Co., 806 Broadway, New York, N. Y. (See page 351.)

INDIANA Rubber & Insulated Wire Co., Jonesboro, Ind.

LIBERTY & Nicholls Mfg. Co., East Norwalk, Conn.

MATTSON Rubber Co., Lodi, N. J. (See page 291.)

MECHANICAL Rubber Co., C. & P. & Nickel Plate R. R., Cleveland, O.

MILFORD Rubber Works, Milford, Ill.

MILLER Rubber Co., Akron, O.

MINERALIZED Rubber Co., 165 Chambers St., New York, N. Y.

NATIONAL India Rubber Co., Bristol, R. I.

NEW Jersey Car Spring & Rubber Co., Wayne & Brunswick Sts., Jersey City, N. J.

NEW York Belting & Packing Co., 91 Chambers St., New York, N. Y.

PARKER, Stearns & Co., 286 Sheffield Ave., Brooklyn, N. Y.

PENNSYLVANIA Rubber Co., Jeannette, Pa.

SEAMLESS Rubber Co., New Haven, Conn.

STANDARD Rubber & Cable Co., Bridgeport, Conn.

THERMOID Rubber Co., Trenton, N. J. (See page 57.)

TYER Rubber Co., Andover, Mass. "Tyrian."

TYRIAN—See Tyer Rubber Co.

UNITED States Tire Co., Broadway & 58th St., New York, N. Y.

VOORHEES Rubber Mfg. Co., 18-46 Bostwick Ave., Jersey City, N. J. (See page 291.)

STEEL TUBING

AMERICAN Tube & Stamping Co., Bridgeport, Conn.

BECKER Steel Co. of America, 90 West St., New York, N. Y. (Importers.)

CLIMAX Metal Products Co., 256-57 Broadway, New York, N. Y. (Distributors.) (See page 551.)

DELAWARE Seamless Tube Co., Auburn, Pa.

DETROIT Seamless Steel Tubes Co., Detroit, Mich. (See page 433.)

FIELD & Co., 723 Arch St., Philadelphia, Pa. (Distributors.) (See page 433.)

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. (Distributors.) (See page 425.)

GLOBE Seamless Steel Tubes Co., 33d Ave. & Burnham St., Milwaukee, Wis.

IVINS Tube Works, Elwood, Oak Lane Station, Philadelphia, Pa.

KREFELD Steel Co., 50 Church St., New York, N. Y. (Importers.)

KRUPP—See Prosser & Son.

MORRIS & Co., E. K., 311-17 W. Second St., Cincinnati, O. (Distributors.) (See page 433.)

NASH Co., George, 217 Pearl St., New York, N. Y. (Distributors.) (See page 433.)

NATIONAL Tube Co., Frick Bldg., Pittsburg, Pa. "Shelby."

OHIO Seamless Tube Co., Shelby, O.

PITTSBURGH Steel Products Co., Frick Annex, Pittsburg, Pa.

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FOR AUTOMOBILE PARTS

TRUE TO PATTERNS
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LARGE CAPACITY
PROMPT DELIVERIES

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SYRACUSE, N. Y.

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TUBING (Continued)

STEEL TUBING (Continued)

PROSSER & Son, Thomas, 15 Gold St., New York, N. Y. (Importers.) "Krupp." (See page 387.)

SHELBY—See National Tube Co.

STANDARD Steel Tube Co., Toledo, O. (See Inside Front Cover.)

STANDARD Welding Co., Cleveland, O. "Stanweld." (See Book Mark.)

STANWELD—See Standard Welding Co.

TOLEDO Steel Tube Co., Toledo, O.

WARD'S Sons, Edgar T., 25 Purchase St., Boston, Mass. (Distributors.) (See page 433.)

TURN-BUCKLES

WROUGHT TURN-BUCKLES

CLEVELAND Hardware Co., Cleveland, O.

COLUMBUS Bolt Works, 162 W. Randolph St., Columbus, O.

DETROIT Screw Works, Detroit, Mich. (See page 347.)

EBERHARD Mfg. Co., 2734 Tennyson Rd., Cleveland, O.

HASKELL Mfg. Co., Wm. H., 24 Commerce St., Pawtucket, R. I.

KANSAS City Bolt & Nut Co. (Sheffield Station), Kansas City, Mo.

MERRILL Bros., Maspeth, N. Y.

MICHIGAN Bolt & Nut Co., ft. Meldrum Ave., Detroit, Mich.

NEW England Bolt & Steel Co., Bowdoin St. (Everett), Boston, Mass.

PAWTUCKET Mfg. Co., 327 Pine St., Pawtucket, R. I.

PENINSULAR Milled Screw Co., Lafayette St., Detroit, Mich.

UNION Elevator & Machine Co., 215-17 W. Ontario St., Chicago, Ill.

WILCOX, Crittenden & Co., 383 Main St., Middleton, Conn.

TURNTABLES

AUTOMOBILE TURNTABLES

(See also Castors and Wheel Trucks).

BEACH Auto Turntable Co., T. C., 313 Lansing St., St. Johns, Mich.

BICYCLE Step Ladder Co., 6 W. Randolph St., Chicago, Ill. "Murray."

CANTON Foundry & Mfg. Co., Canton, O. "Universal." (See page 437.)

ELLIOTT Co., Sterling, Newton, Mass.

ERNST'S Sons, C. F., 75 Lathrop St., Buffalo, N. Y.

LANSING Co., Lansing, Mich.

LINK-BELT Co., Chicago, Ill. (See page 363.)

MURRAY—See Bicycle Step Ladder Co.

NICOLS & Bro., George P., Old Colony Bldg., Chicago, Ill.

NORTHERN Engineering Works, 2 Chene St., Detroit, Mich.

PERFECTION—See Zering Mfg. Co.

PITLESS Auto Turntable Co., 1316 W. Ninth St., Kansas City, Mo.

PORTLAND Garage Co., 49-51 Cross St., Portland, Me.

ROCHESTER Iron Works, Powers Bldg., Rochester, N. Y.

SMITH Iron Co., G. W. & F., Gerard St., Boston, Mass.

TURNER Machine Co., 28-32 Maple Ave., Danbury, Conn.

UNITED Casting Co., Wilson & Violet Sts., Los Angeles, Cal.

UNIVERSAL—See Canton Foundry & Mfg. Co.

ZERING Mfg. Co., H., 528-30 Reading Rd., Cincinnati, O. "Perfection."

TWINE

TUFTING TWINE

MEYER & Co., John C., Lowell, Mass.

TRAVERS Twine & Cordage Co., 81 Warren St., New York, N. Y.

UNIONS

PIPE UNIONS

(See Fittings, Pipe)

TUBING UNIONS

CRUM-WILEY Mfg. Co., Peru, Ind.

DOLE Valve Co., 208 N. Fifth Ave., Chicago, Ill.

HANCOCK Mfg. Co., 770 Henry St., Charlotte, Mich.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. (See page 83.)

LAVIGNE Mfg. Co., 625-41 Commonwealth Ave., Detroit, Mich.

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O.

McRAE & Roberts Co., 211-35 Campbell Ave., Detroit, Mich.

POWELL Co., Wm., 2521-31 Spring Grove Ave., Cincinnati, O.

QUEEN City Brass & Iron Works, Spring Grove Ave., Cincinnati, O.

RICHARDSON-PHENIX Co., 122-28 Reservoir Ave., Milwaukee, Wis. "Union Cinch."

ROBERTS Brass Mfg. Co., 1395-1407 Fort St., W., Detroit, Mich.

UNION CINCH—See Richardson-Phenix Co.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. (See page 293.)

WILLIAMS Valve Co., D. T., Spring Grove Ave., & Township St., Cincinnati, O.

ZERK Mfg. Co., Cleveland, O.

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"More Speed for the Ford"

Special Ratio Differential Ring Gear and Drive Pinion for the Ford. Either 2 4-7—1 or 3—1 ratio

More speed with maximum power at a decreased cost in gasoline and oil consumption is the result obtained by using either of these ratios, because they prevent the **"Racing of the Motor"** which is necessary with the regular gear ratio 3⅝—1 to make time.

The Ford engine has sufficient power to take care of the higher gear under regular conditions and with our 2 4-7—1 ratio gears in the racy type Ford a speed of 60 miles an hour or better is possible on the straightway course.

For the more conservative driver we recommend our 3—1 ratio gears, which are more suitable for country roads, city driving and under general driving conditions permit a speed of 55 miles or better an hour.

MATERIAL USE—Nickel gear steel properly hardened and sand blasted, giving gears almost a polished appearance.

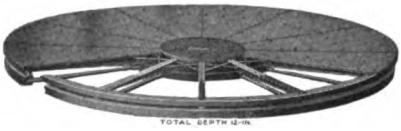
INSTALLATION—Gears are absolutely interchangeable with present gears, a perfect fit being guaranteed. Very little time is required to make the change.

Orders received today—Shipped tomorrow

Detroit Radiator & Specialty Co.

959 Woodward Ave. DETROIT, MICH.

Universal Turntable



EVERY GARAGE

should have a "Universal" Automobile Turntable. *Because:* it relieves congestion and increases the storage capacity; saves time and effort in handling cars; practically eliminates the risk of bumping, scraping and other injuries. Helps bring new business and hold the old customers because it enables you to give better service. Use upstairs or down. Provided with drain, it makes an ideal wash rack.

The "Universal" turns 50% easier than others because equipped with "serpentine" ball race. A size for every garage. Send for Catalog "C-20."

We also manufacture the strongest and handiest Portable Floor Crane and Hoist.

Ask for Crane Catalog "E-20."

The Canton Foundry & Machine Co.

CANTON, OHIO

Newark Worm Gears—

Cut upon automatic machines, to suit the most exacting requirements. We cut worm gears of any diameter, lead, pitch or number of threads in worm.

NEWARK GEARS are the result of many years of experience.

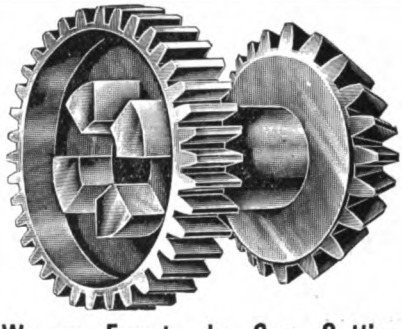
Our Gear Cutting Department is under the supervision of Mr. Henry E. Eberhardt and his sons, specialists in this work. We are prepared to offer our engineering experience in the solution of problems in gearing which require technical knowledge combined with sound practical judgment.

"EXPERIENCE COUNTS"

Let us figure on your requirements.

Newark Gear Cutting Machine Co.

67-69 Prospect St. Newark, N. J.



We are Experts in Gear Cutting

Our specially equipped shop and trained expert workmen enables us to turn out all kinds of high grade

Spur Gears, Sprockets and Bevel Gears

Automobile Machinists

Case-Hardening of all descriptions. Phosphor Bronze, Imported Alloy Steel for the making of High Class Gears and Axles of all descriptions.

Write and state your needs to us.

SIER-BATH CO.

143 W. 54th St., New York

Telephone Col. 2923-24.

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VALVES

ANGLE, GLOBE, CHECK AND GATE VALVES

BASHLIN Co., Warren, Pa.

BELFIELD Co., H., 435 N. Broad St., Philadelphia, Pa.

BUCKEYE Iron & Brass Works, 324 E. Third St., Dayton, O.

CRANE Co., 836 S. Michigan Ave., Chicago, Ill.

DETROIT Brass Works, 2000 Brooklyn Ave., Detroit, Mich.

DETROIT Lubricator Co., Detroit, Mich. (See page 231.)

JARECKI Mfg. Co., Erie, Pa.

JENKINS Bros., 80 White St., New York, N. Y.

KELLY & Jones Co., Greensburg, Pa.

KENNEDY Valve Mfg. Co., Elmira, N. Y.

KINSEY & Mahler Co., 400 S. Adams St., Peoria, Ill.

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O.

McDONALD Mfg. Co., A. Y., Dubuque, Ia.

McNAB & Harlan Mfg. Co., 55 John St., New York, N. Y.

MILWAUKEE Valve Co., 139 Burrell St., Milwaukee, Wis.

PITTSBURG Valve Foundry & Construction Co., 26th St. & A. V. Ry., Pittsburg, Pa.

POWELL Co., Wm., 2521-31 Spring Grove Ave., Cincinnati, O.

QUEEN City Brass & Iron Works, Spring Grove Ave., Cincinnati, O.

STAR Brass Mfg. Co., 108-14 E. Dedham St., Boston, Mass.

STEPHENS Mfg. Co., Roe, Clayton & Parkinson Aves., Detroit, Mich.

WALWORTH Mfg. Co., Boston, Mass.

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

AUTOMATIC FUEL SHUT-OFF VALVES

(For turning off fuel in case of fire)

UNDERWRITERS Valve Co., Industrial Trust Bldg., Providence, R. I.

BALL CHECK VALVES

CRUM-WILEY Mfg. Co., Peru, Ind.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. (See page 83.)

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O.

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

GAS ENGINE VALVES

(For Valves in the rough—See Forgings, Drop)

ELECTRIC Welding Products Co., Cleveland, O. (See page 597.)

LEWIS Electric Welding & Mfg. Co., 4086 Detroit Ave., Toledo, O. (See page 439.)

MICHIGAN Engine Valve Co., 115-17 Columbia St., West, Detroit, Mich. (See page 439.)

MORGAN Mfg. Co., John St., Newport, R. I.

RICH Tool Co., 410 Railway Exchange, Chicago, Ill.

SCHLIEDER Mfg. Co., 45 Fort St., E., Detroit, Mich.

GASOLINE LOCK VALVES

BRADLEY Safety Auto Lock Co., Wyoming Bldg., Denver, Colo.

ESCO Mfg. Co., 1580 Woodward Ave., Detroit, Mich.

GASOLOCK—See Headlight Support Co.

GLOBE Auto Lock Co., Canisteo, N. Y.

HEADLIGHT Support Co., 728 Woodward Ave., Detroit, Mich. "Gasolock."

HILL—See Janney, Steinmetz & Co.

HILL—See Norwalk Iron Works Co.

JANNEY, Steinmetz & Co., Philadelphia, Pa. "Hill." (See page 403)

McRAE & Roberts Co., 211-35 Campbell Ave., Detroit, Mich.

NORWALK Iron Works Co., South Norwalk, Conn. "Hill."

WILLSTAD Mfg. Co., 6717 Sangamon St., Chicago, Ill.

GATE VALVES

(See Valves, Angle)

GLOBE VALVES

(See Valves, Angle)

MIXING VALVES

(See Vaporizers)

MUFFLER CUT-OUT VALVES

APCO—See Auto Parts Co.

AUTO Parts Co., 702 Eddy St., Providence, R. I. "Apco."

BARCO Brass & Joint Co., 212-22 W. Illinois St., Chicago, Ill.

BUFFALO Pressed Steel Co., Military Rd., Buffalo, N. Y.

DUNKIRK Corporation, Dunkirk, N. Y.

EMPIRE—See S. B. R. Specialty Co.

ESSEX—See S. B. R. Specialty Co.

FOWLER Lamp & Mfg. Co., 61 E. 24th St., Chicago, Ill.

G. P.—See Piel Co.

GABRIEL Horn Mfg. Co., 1407 40th St., N. E., Cleveland, O.

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Lewis Valves

Grey Iron Heads
Nickel Steel Heads
Made with the famous
Lewis "X" Alloy

When an engine maker once uses Lewis Inlet and Outlet Valves he "comes back for more." There are good reasons. Try Lewis Valves and you won't need to be told. But here's to tell you, if you haven't tried them.

First—The name Lewis is known for honest service. G. L. Lewis, head of this company, has "been through the mill" from start to finish, and knows what engine men want in *valves*. This Service means quick work and accurate work.

Second—The quality of Lewis alloys is undeviating. Grey iron, nickel steel, "X Alloy," or your own special composition if you prefer; you can rely on specifications being filled with absolute accuracy.

LEWIS VALVES

This trademark is your safeguard

MEMBER

The Lewis Electric Welding & Mfg. Co.

4086 Detroit Avenue, Toledo, Ohio

MICHIGAN POPPETS

BEST FOR YOUR MOTOR

because the heads of gray iron (conceded to be the best metal for valves) cannot possibly work loose.

MICHIGAN VALVES

are of construction proper for their work: Stems of piston-rod steel, accurately ground, and discs of gray iron **fused** on the stem by a patented process. This method of attaching makes disc and stem strictly integral.

Gray iron cannot warp under the heat, and being a softer metal wears the valve seat very little.

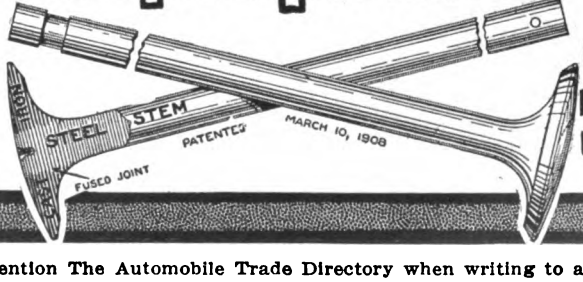
MICHIGAN VALVES are perfect—every one tested and inspected—and their construction keeps them so. Result: Efficient and economical operation of motor, and minimum re-grinding of valves.

Send for sample valve. Inspect the fused-on discs.

Let us figure on your requirements.

Michigan Engine Valve Co.

115-117 Columbia Street West



Detroit Michigan U.S.A.

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VALVES (Continued)

MUFFLER CUT-OUT VALVES (Continued)

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco." (See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

GRAY-HAWLEY Mfg. Co., 937-43 Jefferson Ave., Detroit, Mich.

HANDY—See Lunkenheimer Co.

HEBERT Mfg. Co., Franklin, N. H.

INTERNATIONAL Automobile Supply Co., 117 W. South Water St., Chicago, Ill.

LINCOLN Machine Shops, Lincoln, Ill.

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O. "Handy."

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Radium." (See page 449.)

NATIONAL Jack & Mfg. Co., 130-34 S. Clinton St., Chicago, Ill.

PIEL Co., G., 13th St. & Boulevard, Long Island City, N. Y. "G. P."

POWELL Muffler & Timer Co., 42 La Fayette St., Utica, N. Y. (See page 441.)

RADIUM—See Milwaukee Auto Specialty Co.

RUDIE—See Western Brass Mfg. Works.

S. B. R. Specialty Co., 17-19 Princeton St., East Orange, N. J. "Essex," "Empire."

STANHOPE Forge & Machine Works, 49-51 Lansdowne St., Cambridge, Mass.

STAR Brass Works, 1721-23 Baltimore Ave., Kansas City, Mo.

STRYKER, C. W., 240 Shonnard St., Syracuse, N. Y.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. "Rudie." (See page 293.)

YANKEE Co., 69 Genesee St., Utica, N. Y.

NEEDLE VALVES

AMERICAN Brass & Iron Co., Detroit, Mich. (See page 211.)

DETROIT Brass Works, 2000 Brooklyn Ave., Detroit, Mich.

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O.

POWELL Co., Wm., 2521-31 Spring Grove Ave., Cincinnati, O.

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

PRESSURE REGULATING VALVES

(See Regulators, Pressure)

STEAM SAFETY VALVES

AMERICAN Steam Gauge & Valve Mfg. Co., 220 Camden St., Boston, Mass.

ASHTON Valve Co., 271 Franklin St., Boston, Mass.

STAR Brass Mfg. Co., 108-14 E. Dedham St., Boston, Mass.

STEPHENS Mfg. Co., Roe, Clayton & Parkinson Aves., Detroit, Mich.

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

STEAM THROTTLE VALVES

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

TIRE VALVES

ATLAS Auto Supply Co., 3240 W. Lake St., Chicago, Ill. "Day." (See page 131.)

DAY—See Atlas Auto Supply Co.

ST. LOUIS Pneumatic Valve Co., 2520-26 N. Spring Ave., St. Louis, Mo.

SCHRADER'S Son, A., 783-91 Atlantic Ave., Brooklyn, N. Y. (See page 441.)

STEVENS Mfg. & Supply Co., Fischer Bldg., Chicago, Ill.

TIRE SAFETY VALVES

ARTIZAN Brass Co., 218 N. Jefferson St., Chicago, Ill.

MYERS Auto Tire Safety Valve Co., Postal Telegraph Bldg., Chicago, Ill.

SALUS—See Sioux City Machine & Tool Co.

SIOUX City Machine & Tool Co., First & Virginia Sts., Sioux City, Ia. "Salus."

TWO WAY TANK VALVES

(Fuel Reserve Valves or Cocks)

BREEZE Carbureter Co., 250-52 South St., Newark, N. J.

IDEAL Brass Works, Tenth & Canal Sts., Indianapolis, Ind.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. (See page 83.)

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O. "Quadlock."

QUADLOCK—See Lunkenheimer Co.

VANADIUM

AMERICAN Vanadium Co., Vanadium Bldg., Pittsburg, Pa.

VAPORIZERS

GASOLINE VAPORIZERS OR MIXING VALVES

LUNKENHEIMER Co., 223 E. Eighth Ave., Cincinnati, O. "Nonpareil."

NONPAREIL—See Lunkenheimer Co.

WILKINSON Co., Wm. H., West Medway, Mass.

WILLIAMS Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati, O.

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Universal

Tire Pressure Gauge
Price, $1.00

What's in a Name

THE name SCHRADER is a guarantee of quality. The reputation which we have acquired rests upon seventy years of service to the trade and public. Since its establishment in 1864 the Schrader firm has had PERFECTION as its watchword.

Take advantage of the reputation which we have made for our goods and of the demand which we have created for them.

There is no risk in stocking Schrader goods. You can sell as many Schrader gauges as there are cars in use and as many Schrader valves as there are inner tubes made.

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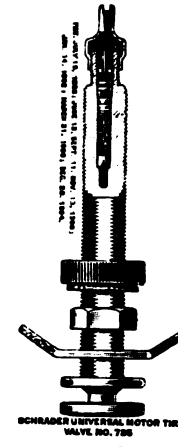
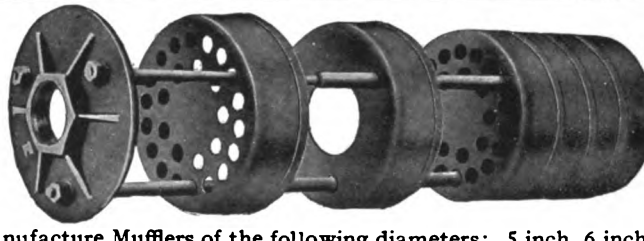
SCHRADER
Universal
VALVES



Are the regular equipment of 9/10 of all automobile and bicycle tires made in the United States.

"There's a Reason"

Powell Pressed Steel Muffler



WE manufacture Mufflers of the following diameters: 5 inch, 6 inch and 6¾ inch and we use the number of sections necessary to properly muffle the different size motors that are on the market.

5 inch diameter Mufflers are stamped from 20 gauge steel
6 " " " " " " 18 " "
6¾ " " " " " " 16 or 18 gauge steel.

This muffler is made up of a succession of pressed steel cups drawn from sheet metal. Each cup is shouldered so that it overlaps the bottom of the succeeding one by one-fourth of an inch.

The end plates are malleable iron, with pipe or flange connection.

The perforations are around the outer edge of each baffling plate with an additional one in the center of the first few, the area of these holes varying with the size of the engine to be muffled.

The POWELL MUFFLER is *standard equipment on 36 of the best AMERICAN made automobiles and trucks*, which is ample proof of its efficiency and durability.

Powell Muffler & Timer Co.
42 La Fayette Street Utica, N. Y.

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VARNISHES

AKRON Varnish Co., Akron, O.

AMERICAN Varnish Co., 1138 N. Branch St., Chicago, Ill.

ANGLO - AMERICAN Varnish Co., 53-63 Johnson St., Newark, N. J.

ARMITAGE & Co., John L., Newark, N. J.

ATLANTIC Varnish Works, Richmond, Va.

AULT & Wilborg Co., New, Seventh & Culvert Sts., Cincinnati, O.

BAY STATE—See Wadsworth, Howland & Co.

BECKWITH-CHANDLER Co., 320 Fifth Ave., New York, N. Y.

BERRY Bros., Detroit, Mich.

BILLINGS-CHAPIN Co., Cleveland, O.

BOSTON Varnish Co., Everett, Mass.

BROOKS & Co., Clarence, 249-77 Chestnut St., Newark, N. J.

BUCKEYE Paint & Varnish Co., 15th & Lucas Sts., Toledo, O.

BULLS-EYE—See Zinsser & Co.

CHASE, Roberts & Co., Fifth St. & West Ave., Long Island City, N. Y. "Kismet."

CHI-VAR-CO—See Chicago Varnish Co.

CHICAGO Varnish Co., 2100 Elston Ave., Chicago, Ill. "Chi-Var-Co."

CINCINNATI Varnish Co., 211 South St., Cincinnati, O.

CLEVELAND Varnish Co., 3111 E. 87th St., Cleveland, O. "Frelastic."

COLUMBUS Varnish Co., Columbus, O. (See page 155.)

DEVOE & C. T. Raynolds Co., F. W., 101 Fulton St., New York, N. Y.

ELMENDORF Varnish Co., 845 Larrabee St., Chicago, Ill.

EMPIRE Varnish Co., 2638-42 E. 76th St., Cleveland, O.

FLINT Varnish Works, Flint, Mich.

FLOOD & Conklin Co., 136 Chestnut St., Newark, N. J. "Radium."

FOREST City Paint & Varnish Co., 3334 Lakeside Ave., Cleveland, O.

FRELASTIC—See Cleveland Varnish Co.

FRENCH & Co., Samuel H., York Ave., Fourth & Callowhill Sts., Philadelphia, Pa.

GILLESPIE & Son, Chas. H., 19 Dey St., Jersey City, N. J.

GLIDDEN Varnish Co., W. Madison Ave. & L. S. & M. S. Ry., Cleveland, O.

GRAVES Co., N. Z., 22-26 S. Third St., Philadelphia, Pa.

GREGG Varnish Co., St. Louis, Mo.

HARLAND & Son, Wm., Genesee St. & Erie Canal, Buffalo, N. Y. "Whitest."

HILDRETH Varnish Co., 90 West St., New York, N. Y.

HOTOPP Varnish Co., First & Marshall Sts., Hoboken, N. J.

KISMET—See Chase, Roberts & Co.

LUCAS & Co., John, 322-30 Race St., Philadelphia, Pa.

MASURY & Son, John W., New York, N. Y.

MOLLER & Schumann Co., Marcy & Flushing Aves., Brooklyn, N. Y.

MOORE & Co., Benjamin, 231-33 Front St., Brooklyn, N. Y.

MOUND City Paint & Color Co., 11th & Mullanphy Sts., St. Louis, Mo.

MURPHY Varnish Co., Chestnut & McWhorter Sts., Newark, N. J.

PARROTT Varnish Co., 453 N. Washington Ave., Bridgeport, Conn.

PAYSON Varnish Co., 141st St. & Walnut Ave., New York, N. Y.

PRATT & Lambert, Buffalo, N. Y.

QUEEN City Varnish Co., Cincinnati, O.

RADIUM—See Flood & Conklin Co.

RICKER-BENNETT Co., 37 Harris St. (N. Cambridge), Cambridge, Mass.

SCHRACK & Co., C., 152 N. Fourth St., Philadelphia, Pa.

SHERWIN-WILLIAMS Co., 100 Canal St., Cleveland, O.

SMITH & Co., Edward, Sixth St. & West Ave., Long Island City, N. Y.

STANDARD Varnish Works (Elm Park), Port Richmond, N. Y.

STEWART-MOWRY Co., 3214 Shields Ave., Chicago, Ill.

STULB Varnish Co., Joseph, Haddon Ave. & White Horse Pike, Camden, N. J.

VALENTINE & Co., 456 Fourth Ave., New York, N. Y. "Vanadium."

VANADIUM—See Valentine & Co.

WADSWORTH, Howland & Co., 84 Washington St., Boston, Mass. "Bay State."

WHEELER Varnish Works, 2260 Elston Ave., Chicago, Ill.

WHITEST—See Harland & Son.

ZINSSER & Co., W., 195 William St., New York, N. Y. "Bulls-Eye."

VENTILATORS

LIMOUSINE AND FORE DOOR VENTILATORS

COWLES & Co., C., New Haven, Conn. (See page 87.)

DOUGLAS & Lomason Co., Detroit, Mich. (See page 211.)

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco." (See page 83.)

GEMCO—See Garage Equipment Mfg. Co.

O'BRIEN Mfg. Co., Joseph F., 63 Park Pl., New York, N. Y. (See page 87.)

OCHSNER & Sons Co., A., 1060 State St., New Haven, Conn.

SMITH & Co., Jos. N., Detroit, Mich. (See page 547.)

TROY Auto Specialty Co., Troy, N. Y.

UNIQUE Findings & Supply Co., 36 Garnet St., Providence, R. I.

WESTERN Brass Mfg. Works, Marshall Blvd., 21st St. & C. B. & Q. R. R., Chicago, Ill. (See page 293.)

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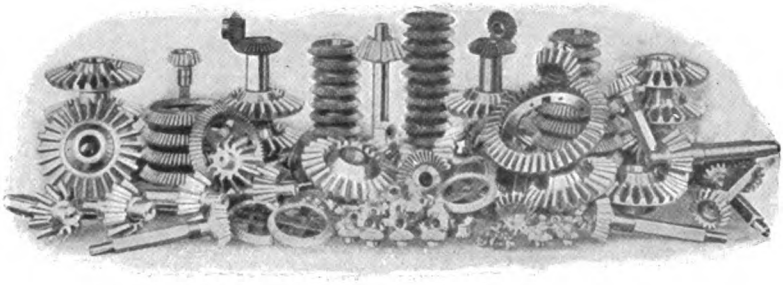
This Trade-Mark Insures To You

HIGH-GRADE GEARS FOR EVERY KIND OF SERVICE



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We make both kinds, and can advise the best for any given work, without bias.

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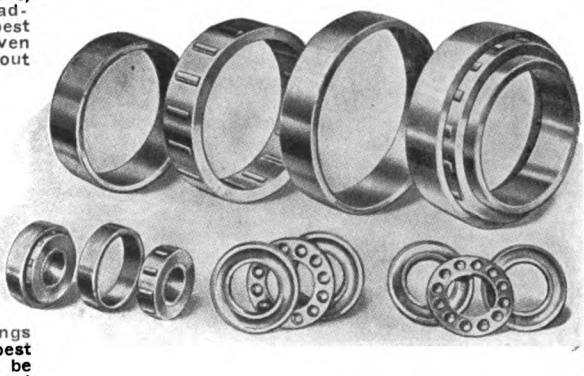

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Standard Machinery Co., Auburn, Rhode Island

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VENTILATORS (Continued)

WIND SHIELD VENTILATORS

MORRIS Hardware Co., Connellsville, O. "Ventor."

SECURITY Co., 30 Shingiss St., Pittsburg, Pa.

VENTOR—See Morris Hardware Co.

VISORS

WIND SHIELD VISORS

ROAD-VIEW—See Smith & Co.

SMITH & Co., Jos. N., Detroit, Mich. "Road-View." (See page 547.)

VOLTMETERS

(See Ammeters; also Gauges, Battery)

VULCANIZERS

PORTABLE VULCANIZERS

ADAMSON Mfg. Co., East Palestine, O. "Universal." (See page 449.)

AUTO Steam Vulcanizer Co., Cincinnati, O.

AUTOMATIC Device Co., 551 E. Jefferson St., Frankfort, Ind. "Economy."

BADGER—See Tire Repair Equipment Co.

BROWN Co., 213 Bellevue Ave., Syracuse, N. Y.

DIAMOND Mfg. Co., Equitable Bldg., Des Moines, Ia.

ECONOMY—See Automatic Device Co.

ECONOMY—See Garage Equipment Mfg. Co.

ELECK-TRICK—See Gibney Tire & Rubber Co.

ELECTRIC Vulcanizer Co., 618 Third Ave. S., Minneapolis, Minn. "Minneapolis."

FEDERAL Auto Accessories Co., Union National Bank Bldg., Columbus, O. "S.S.S."

G-WIZ—See National Motor Supply Co.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Economy." (See page 83.)

GENESEE Specialty Co., 4 West Ave., Rochester, N. Y.

GIBNEY Tire & Rubber Co., Philadelphia, Pa. "Eleck-Trick."

GILLILAND Auto Supply Co., D. C., 3355 S. Grand Ave., St. Louis, Mo.

GILSON Motor Starting Co., 1407-09 N. Illinois St., Indianapolis, Ind.

GWINN-BACON Vulcanizer Co., 34-37 Arsenal St., St. Louis, Mo.

HILL-STAGE Co., 604 Jackson St., Anderson, Ind.

HIPWELL Mfg. Co., 831-35 North Ave., W., Pittsburg, Pa.

KENMORE Mfg. Co., 15 N. Crawford Ave., Chicago, Ill.

LAZARUS Mfg. Co., 746 Euclid Ave., Cleveland, O.

LEADER Mfg. Co., 3049 W. 25th St., Cleveland, O. "Peerless."

LITTLE WONDER—See Rice & Dayton Mfg. Co.

MABURN—See Mapes & Burns Mfg. Co.

MAPES & Burns Mfg. Co., 16 Fulton Ave., Rochester, N. Y. "Maburn."

MARVEL Auto Supply Co., 1220 W. Sixth St., Cleveland, O.

MASCO—See Milwaukee Auto Specialty Co.

MILLER, Chas. E., 1400 S. Meridian St., Anderson, Ind.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Masco," "Radio." (See page 449.)

MINNEAPOLIS—See Electric Vulcanizer Co.

NATIONAL Cement & Rubber Co., 300-16 S. St. Clair St., Toledo, O.

NATIONAL Motor Supply Co., 5606 Euclid Ave., Cleveland, O. "Wizard," "G-Wiz."

NEW Process Vulcanizer Co., 665-67 Spring St., Toledo, O. "Vul-car."

NURINKLE—See Stevenson, R. E.

PEERLESS—See Leader Mfg. Co.

POSITIVE Supply Co., 415½ Rock Island St., Davenport, Ia.

RADIO—See Milwaukee Auto Specialty Co.

RICE & Dayton Mfg. Co., 115-19 E. Fourth St., Cedar Falls, Ia. "Little Wonder."

S.S.S.—See Federal Auto Accessories Co.

SHALER Co., C. A., 900 Fourth St., Waupun, Wis. "Vul-Kit," "Stitch-In-Time." (See page 445.)

SIMPLEX Vulcanizer Co., 2422 Manderson St., Omaha, Neb.

SIMPLICITY Supply Co., 2187 E. Second St., Cleveland, O.

STEVENSON, R. E., 518 N. Capitol Ave., Indianapolis, Ind. "Nurinkle."

STITCH-IN-TIME—See Shaler Co.

TIRE Repair Equipment Co., 740 Johnson St., Appleton, Wis. "Badger."

U. S. Auto Supply Co., 182 Grand River Ave., Detroit, Mich. "Uneeda."

UNEEDA—See U. S. Auto Supply Co.

UNIVERSAL—See Adamson Mfg. Co.

VUL-CAR—See New Process Vulcanizer Co.

VUL-KIT—See Shaler Co.

WESTINGHOUSE Electric & Mfg. Co. (E. Pittsburg), Pittsburg, Pa.

WETHERHOLT Sporting Goods Co., 155 N. High St., Columbus, O.

WHEELING Stove & Range Co., 86 19th St., Wheeling, W. Va.

WIZARD—See National Motor Supply Co.

SHOP VULCANIZERS

AKRON-WILLIAMS—See Williams Foundry & Machine Co.

ALLEN—See Diamond Mfg. Co.

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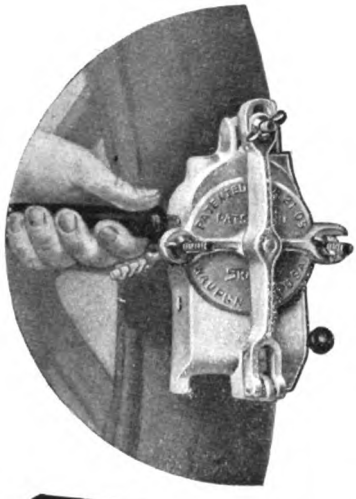

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The Shaler is the "Standard" vulcanizer used by the best garages and repair shops everywhere. We make the only complete line of vulcanizers—for motorists from $2.00 to $12.50—for garages from $20 to $60. We are the largest manufacturers of vulcanizers in the world, and our complete line includes vulcanizers of every type—Electric, Gasoline, Alcohol and Steam, for every requirement.

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For Motorists - Dealers Garages and Repair Shops

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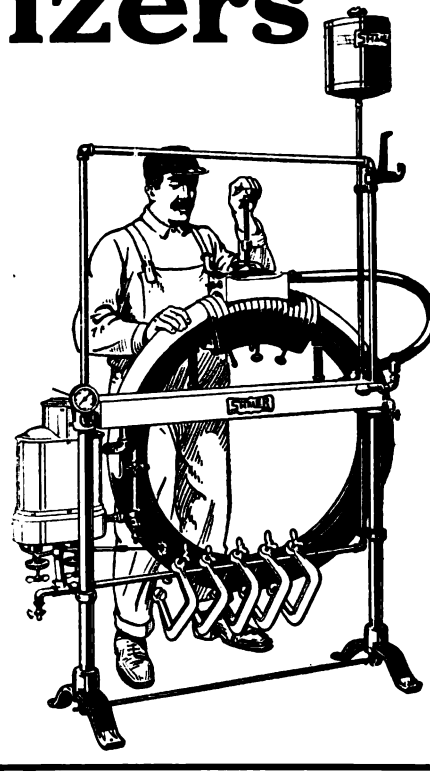

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900 Fourth Street Waupun, Wisconsin, U.S.A.

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Canadian Distributors, John Millen & Son, Limited

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VULCANIZERS (Continued)

SHOP VULCANIZERS (Continued

AUTO Tire Vulcanizing Co., Lawrence St., Lowell, Mass.

BADGER—See Tire Repair Equipment Co.

BIGGS Boiler Works Co., Akron, O.

BURGE Machine Works, 218-30 N. Jefferson St., Chicago, Ill. "Excelsior."

COMET Mfg. Co., Flandrau, S. Dak.

DIAMOND Mfg. Co., Des Moines, Ia. "Allen."

ELECTRIC Vulcanizer Co., 618 Third Ave. S., Minneapolis, Minn. "Minneapolis."

EXCELSIOR—See Burge Machine Works.

H. & H. Mfg. Co., 511 N. Ninth St., Lafayette, Ind.

HAYNER—See Mason Mfg. Co.

HAYWOOD Tire & Equipment Co., Indianapolis, Ind.

HILL-STAGE Co., 604 Jackson St., Anderson, Ind.

MARTIN & Bro., Fred., 161 Bertie St., Pomona, Cal.

MASON Mfg. Co., Mason, Mich. "Hayner."

MILLER, Chas. E., 1400 S. Meridian St., Anderson, Ind.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Radium."
(See page 449.)

MINNEAPOLIS—See Electric Vulcanizer Co.

NATIONAL Motor Supply Co., 5606 Euclid Ave., Cleveland, O.

PROGRESSIVE Mfg. Co., 468 64th Ave. (West Allis), Milwauke, Wis.

RADIUM—See Milwaukee Auto Specialty Co.

SHALER Co., C. A., 900 Fourth St., Waupun, Wis.
(See page 445.)

STANDARD Welding & Mfg. Co., 951 Main St., Buffalo, N. Y.

TIRE Repair Equipment Co., 740 Johnson St., Appleton, Wis. "Badger."

VANDERPOOL Co., 723 W. Mulberry St., Springfield, O.

WHEELING Stove & Range Co., 86 19th St., Wheeling, W. Va.

WILLIAMS Foundry & Machine Co., Ash St., Akron, O. "Akron-Williams."

WARMERS

FOOT WARMERS

(See Heaters, Automobile)

WASHERS

CORK WASHERS

ARMSTRONG Cork Co., 23d St. & Railroad Ave., Pittsburg, Pa.
(See page 215.)

DIAMOND Cork Co., 59 Pearl St., New York, N. Y.

MUNDET & Son, L., King, Ferris & Sullivan Sts., Brooklyn, N. Y.

PADDOCK Cork Co., 1209-17 De Kalb Ave., Brooklyn, N. Y.

SPANISH-AMERICAN Cork Co., 2211 Pennsylvania Ave., Baltimore, Md.

FELT WASHERS

ADVANCE Felt Specialty & Cutting Co., 609 N. La Salle Ave., Chicago, Ill.

AMERICAN Felt Co., 103 Bedford St., Boston, Mass.

BOOTH Felt Co., 440-50 19th St., Brooklyn, N. Y.
(See page 447.)

BRAUNSDORF, Geo. W., 232-34 E. 43d St., New York, N. Y.

BRAWLEY, T. R., 85-87 Adams St., Brooklyn, N. Y.
(See page 449.)

HOUSE & Sons, Chas. W., Unionville, Conn.

SUTHERLAND Co., F. L., 139 Beaubien St., Detroit, Mich.
(See page 449.)

WESTERN Felt Works, 4115-33 Ogden Ave., Chicago, Ill.

FINISHING WASHERS

KEELER Brass Co., 261-71 Godfrey Ave., Grand Rapids, Mich.

READ Co., A. P., 427-41 W. Randolph St., Chicago, Ill.

STANLEY Works, Dept. U., New Britain, Conn.
(See page 211.)

IRON AND STEEL WASHERS

AMERICAN Iron & Steel Mfg. Co., Front & Cumberland Sts., Lebanon, Pa.

AVERY Stamping Co., 5209 Lakeside Ave., Cleveland, O.

BETTCHER Mfg. Co., Cleveland, O.

BOSSERT Co., Utica, N. Y.
(See page 223.)

CLARK Bros. Bolt Co., Milldale, Conn.
(See page 77.)

COLUMBUS Bolt Works, 162 W. Randolph St., Columbus, O.

CORBIN Screw Corp., 219 High St., New Britain, Conn.

FALLS Rivet Co., Kent, O.

GASKET Supply Co., 1729 Ludlow St., Philadelphia, Pa.

HOEFELD & Co., R., Buffalo, N. Y.

HUBBARD Spring Co., M. D., Pontiac, Mich.
(See page 293.)

IRELAND & Matthews Mfg. Co., 51-79 Iron St., Detroit, Mich.

KANSAS City Bolt & Nut Co. (Sheffield Station), Kansas City, Mo.

McKINNEY Mfg. Co., Pittsburg, N. S., Pa.

NEW England Bolt & Steel Co., Bowdoin St., (Everett), Boston, Mass.

PITTSBURG Screw & Bolt Co., Preble Ave. (N. S.), Pittsburg, Pa.

PLYMOUTH Mills, Plymouth, Mass.

QUADRIGA Mfg. Co., 119 N. Canal St., Chicago, Ill.

RELIANCE Mfg. Co., Massillon, O.
(See page 451.)

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Felt Washers

N. E. Booth Makes Felt Washers—makes them better and quicker and cheaper than you can probably get them anywhere else in these United States.

The reason? He specializes. He makes it his sole business to supply you with washers, packings, dust and oil rings and other felt goods more advantageously than anyone else can. And he succeeds.

Prove this to your own satisfaction by trying Booth on your next felt order. You'll find the "specialist" can save you both time and money and give better service.

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CANADIAN OFFICE AND FACTORY, GANANOQUE, ONTARIO

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WASHERS (Continued)

IRON AND STEEL WASHERS (Continued)

REPUBLIC Iron & Steel Co., Republic Bldg., Youngstown, O.

SESSIONS & Son, J. H., Bristol, Conn.

SMITH Co., Thomas, 13 Cypress St., Worcester, Mass.

STANLEY Works, Dept. U., New Britain, Conn. (See page 211.)

STEELE & Johnson Mfg. Co., 779 S. Main St., Waterbury, Conn.

UPSON Nut Co., Unionville, Conn.

WROUGHT Washer Mfg. Co., S. Bay & Reynolds Sts., Milwaukee, Wis.

LEATHER WASHERS

ALGCO—See Auburn Leather Goods Co.

AUBURN Leather Goods Co., Auburn, N. Y. "Algco."

BRACE Leather Goods Co., 22 Wayne St., Pontiac, Mich.

CHICAGO Rawhide Co., 1301 Elston Ave., Chicago, Ill.

DETROIT Leather Specialty Co., 275 Beecher Ave., Detroit, Mich.

DUCKWALL Belting & Hose Co., 516 Capitol Blvd., Indianapolis, Ind.

G & K—See Graton & Knight Mfg. Co.

GRATON & Knight Mfg. Co., Worcester, Mass. "G & K." (See page 65.)

HOEFELD & Co., R., Buffalo, N. Y.

JUDD & Leland Mfg. Co., Clifton Springs, N. Y. (See pages 205 and 479.)

MARSH Co., Charles W., Muskegon, Mich.

SOVEREIGN Co., C. E., 112-20 Court Pl., Rockford, Ill.

SUTHERLAND Co., F. L., 139 Beaubien St., Detroit, Mich. (See page 449.)

LOCK WASHERS

(See Nuts, Lock)

STEEL SPRING WASHERS

BARNES Co., Wallace, Wallace & Parallel Sts., Bristol, Conn.

HOBBS Mfg. Co., Worcester, Mass.

VEHICLE WASHERS

ADVANCE Mfg. Co., E. Atlantic Ave., Franklin, Pa.

BINKS—See Star Brass Works.

BURKE—See Superior Brass Mfg. Co.

CATARACT Auto-Vehicle Washer Co., Topeka, Kans.

CENTURY Foundry Co., 1622 N. Salina St., Syracuse, N. Y. "Wizard."

CLOOS—See Imperial Valve Co.

CROWN—See King, H. P.

DE LUXE—See F. A. M. Auto Supply Co.

EDGAR Mfg. Co., 104 Hanover St., Boston, Mass.

EVERREADY—See Smith Mfg. Co.

F. A. M. Auto Supply Co., 698 Main St., Buffalo, N. Y. "De Luxe."

FEDERAL—See Walworth Mfg. Co.

GAYLORD Sanitary Mfg. Co., 561 Main St., E., Rochester, N. Y.

HICKS Brush Co., Howard A., 826 18th St., Denver, Colo.

IMPERIAL Valve Co., 847 Holton St., Milwaukee, Wis. "Cloos."

IRVING—See Smith Mfg. Co.

KING, H. P., 3112 Lorain Ave., Cleveland, O. "Crown," "Peerless."

KIRCHER & Wood, Peoria, Ill.

L. & M.—See Long Machine Works.

LONG Machine Works, Adam A., Ave. E & St. Paul St., Rochester, N. Y. "L. & M."

MONITOR—See Rhodes Mfg. Co.

MULLER, Edward, 1304 John St., East New Durham, N. J.

PEERLESS—See King, H. P.

PEORIA Overhead Vehicle Washer Co., 115 S. Jefferson St., Peoria, Ill.

PERFECT Mfg. Co., Albany, N. Y.

PERFECTION—See Ryan & Long.

RHODES—See Vehical Specialty Co.

RHODES Mfg. Co., 32 Union Pl., Hartford, Conn. "Monitor."

RUBBERSET Co., 56 Ferry St., Newark, N. J.

RYAN & Long, 586 Oneida St., Appleton, Wis. "Perfection."

SANITAX Brush Co., 2333 S. Wabash Ave., Chicago, Ill.

SMITH Mfg. Co., I. J., 1007 Ave. Q., Brooklyn, N. Y. "Irving," "Everready."

SMITH & Co., Jos. N., Detroit, Mich. (See page 547.)

STAR Brass Works, 1909-11 Fulton St., Chicago, Ill. "Binks."

SUPERIOR Brass Mfg. Co., 106 S. Eighth St., St. Louis, Mo. "Burke."

UNIVERSAL—See Utilities Equipment Co.

UTILITIES Equipment Co., 31 State St., Boston, Mass. "Universal."

VEHICLE Specialty Co., 26 State St., Hartford, Conn. "Rhodes."

WALWORTH Mfg. Co., Boston, Mass. "Federal."

WESTERN Robe Mills, 43-45 Peck Ct., Chicago, Ill.

WIZARD—See Century Foundry Co.

WASTE

COTTON WASTE

ARBELLA Waste Co., 1210 Dorchester Ave., Boston, Mass.

BISHOP Mfg. Co., Robert (S. Boston), Boston, Mass.

BLAKELEY & Son, John, 1089 Germantown Ave., Philadelphia, Pa.

BRIGGS & Co., H. A., 242-52 Pine St., Pawtucket, R. I.

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The ADAMSON is the "Modern" vulcanizer—the only exclusive and complete line—from the small portable vulcanizers for motorists' use on the road or at home, to the complete equipment for Garages and Repair Shops.

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Will repair 4 tubes or 2 tubes and 2 tires at same time in 20 to 30 minutes.

Heated by kerosene—can be used anywhere.

Steam heat under absolute steady control.

Automatic control makes perfect cure throughout. Heated in 10 minutes.

Guaranteed to give satisfaction.

No. 2. List Price $35.00

Write for Discounts.

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WASTE (Continued)

COTTON WASTE (Continued)

EGAN Waste Co., 19 Burling Slip, New York, N. Y.

ESTES Mills, Fall River, Mass.

FIDELITY—See Hagy Waste Works.

FOWLER Waste Mfg. Co., Vineland, N. J.

FULTON Bag & Cotton Mills, Atlanta, Ga.

HAGY & Son, Clayton L., 16th & Carpenter Sts., Philadelphia, Pa.

AGY Waste Works, J. Milton, 926-42 Swanson St., Philadelphia, Pa. "Fidelity."

HOFFMAN-CORR Mfg. Co., 594 Broadway, New York, N. Y.

LILLIE Co., Dexter P., Indian Orchard, Mass.

MASSASOIT Mfg. Co., Fall River, Mass.

OLMSTED & Tuttle Co., McKinley Ave., Chicopee, Mass.

RIVERSIDE Mills, Kollock & Bay Sts., Augusta, Ga.

ROWACO—See Royal Waste Co.

ROYAL Mfg. Co., 30 E. Grand St., Rahway, N. J.

ROYAL Waste Co., 146 Oliver St., Boston, Mass. "Rowaco."

SNOW DRIFT—See Sweetland Waste Co.

SOUTH Atlantic Waste Co., Charlotte, N. C.

SPRINGFIELD Waste Co., Mill St., Springfield, Mass.

STANDARD Waste Mfg. Co., 2306-10 N. American St., Philadelphia, Pa.

SWEETLAND Waste Co. (S. Boston), Boston, Mass. "Snow Drift."

TRAVERS Twine & Cordage Co., 81 Warren St., New York, N. Y.

UNION Wadding Co., Pawtucket, R. I.

WATCHES

LIMOUSINE WATCHES

NEW England Watch Co., Waterbury, Conn.

WALTHAM Watch Co., Waltham, Mass. (See page 119.)

WEBBING

JUTE WEBBING

BUFFALO Weaving & Belting Co., 234 Chandler St., Buffalo, N. Y.

LANDERS Bros. Co., Dept. A, Toledo, O. (See page 427.)

LUDLOW Mfg. Associates, Boston, Mass.

SUSQUEHANNA Webbing Co., Bloomsburg, Pa.

WELDING

AUTOGENOUS WELDING

ADVANCE Welding & Machine Co., 111 N. Desplaines St., Chicago, Ill.

AIRD Motor Co., 2 Federal St., Troy, N. Y.

AKRON Welding Co., Sweitzer Ave. & Crosier St., Akron, O.

AMERICAN Welding Co., 2637 Michigan Ave., Chicago, Ill.

AMERICAN Welding & Auto Repair Co., 23d & Olive Sts., St. Louis, Mo.

ATLAS Oxy-Acetylene Welding & Supply Co., 2930 Penn Ave., Pittsburgh, Pa.

ATLAS Welding Works, 2424 Elizabeth Ave., Rahway, N. J.

BIRMINGHAM Welding & Machinery Co., 118 S. 22d St., Birmingham, Ala.

BOSSERT Co., Utica, N. Y. (See page 223.)

BOURNONVILLE Welding Co., Eug., 241-45 W. 64th St., New York, N. Y.

BRAZING & Welding Co., 1615 Wabash Ave., Chicago, Ill.

BROOKLYN Welding Co., 29 York St., Brooklyn, N. Y.

BUSCH-HARTMAN Co., 716 Golden Gate Ave., San Francisco, Cal.

CAPITOL Welding Co., 45-47 Sabin St., Providence, R. I.

CAVE Welding Co., 32 Liberty St., Springfield, Mass.

CHAMPION Welding & Mfg. Co., 898 Washington St., Buffalo, N. Y.

COLUMBUS Welding Shop, 294-96 N. Third St., Columbus, O.

CROSBY Co., Buffalo, N. Y. (See page 157.)

DAVIS Sewing Machine Co., Linden & Davis Sts., Dayton, O.

DELCAMPE Welding Co., 1517 Wood Ave., Bridgeport, Conn.

DES MOINES Welding Co., 117-19 Grand Ave., Des Moines, Ia.

DETROIT Welding Specialty Co., 152 Congress St., E., Detroit, Mich.

DYER Apparatus Co., 155 Brookline St., Cambridge, Mass.

ELLINGER Mfg. Co., Walter, 827 Pennsylvania Ave., Sheboygan, Wis.

GREAT Lakes Welding Co., 937-45 West St., Cleveland, O.

HAVENS Bros., Mfg. Co., 1622 Wazee St., Denver, Colo.

HUB Machine, Welding & Contracting Co., 22d & Race Sts., Philadelphia, Pa.

JACOBS Co., F. L., 451 Guoin St., Detroit, Mich.

JOHNSON Welding & Auto Repair Co., 714 S. Wabash Ave., Chicago, Ill.

LACLEDE Iron Works, 1315 Chestnut St., St. Louis, Mo.

LAWRENCE & Co., L., 292 Halsey St., Newark, N. J.

MANUFACTURERS Welding Co., 740 Jamaica Ave., Brooklyn, N. Y.

METAL Welding & Supply Co., 809-11 Broadway, Denver, Colo.

METALS Welding Co., 4400 Perkins Ave., Cleveland, O.

NATIONAL Welding & Mfg. Co., 1418-30 Niagara St., Buffalo, N. Y.

OHIO Welding & Mfg. Co., 828-30 W. Sixth St., Cincinnati, O.

OREGON Welding & Mfg. Co., 805 Glisan St., Portland, Ore.

OXY-ACETYLENE Welding Co., 1921 Grand Ave., Kansas City, Mo.

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"Type B"

"Type D"

"Type C"

Most complete line of types and sizes on the market. Highest quality, prompt shipments and absolutely guaranteed.

Write for new catalogue—just issued.

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Positive

The POSITIVE Lock Washer

Plain

Made in all sizes and weights for Automobile purposes. Can be used thinner than any other lock washer—effective, no matter how thin. One lock under the nut and head can be used if so desired. Exhaustive tests, covering a period of nearly 12 years on railroad track, drop presses, Automobiles and machinery subject to vibration, have proven its superiority over every nut lock manufactured. *Write for samples and price.*

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Why pay good money for new parts when we can weld your cracked cylinders and crankcases and make them as strong and efficient as any new part—and charge from one-half to three-quarters less?

SEND US YOUR SCORED CYLINDERS

We make a specialty of this work using a unique and effective process to repair cylinder scored from a loose wrist pin. Bore is not enlarged—the same piston and rings will fit repaired cylinder.

Charges according to size of bore.

You Can Save Many Dollars—and Get Prompt Service

Yes, we can save you many dollars that would otherwise be spent for new parts which would be *no* stronger than repaired parts. And remember that all repairs are made within 24 hours after we receive the part—and that *we guarantee all our work for one year from date of repair.*

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WELDING (Continued)

AUTOGENOUS WELDING (Continued)

OXY-ACETYLENE Welding & Machine Co., 1818 Webster Ave., New York, N. Y.

OXY-CARBI Co., New Haven, Conn.

PIONEER Welding Co., 610 E. Main St., Kalamazoo, Mich.

PITTSBURGH Reinforced Brazing & Machine Co., 2525 Liberty Ave., Pittsburg, Pa.

PITTSFIELD Welding Co., 92 Renne Ave., Pittsfield, Mass.

PREST-O-LITE Co., 1400 Speedway, Indianapolis, Ind.
(See page 515.)

R. I. Welding & Sherardizing Co., Promenade & Park Sts., Providence, R. I.

SANFORD Mfg. Co., F. C., Bridgeport, Conn.
(See page 511.)

SCHAAP Automobile Co., 344 Cumberland St., Brooklyn, N. Y.

SMITH & Co., W. R., 304-06 W. 52d St., New York, N. Y.

SORENSON, C., 18 E. 16th St., Chicago, Ill.

STERLING Engine Co., 331 S. Clinton St., Chicago, Ill.

SUPERIOR Welding & Machine Co., Quintard Pl., Stamford, Conn.

TRAGESER Steam Copper Works, John, 447-57 W. 26th St., New York, N. Y.

TWIN City Welding Co., 313 Seventh Ave., S., Minneapolis, Minn.

VULCAN Brazing & Machine Co., 310-12 N. 16th St., Philadelphia, Pa.
(See page 521.)

WATERBURY Welding Co., 1147 South St., Waterbury, Conn.
(See page 451.)

WATERHOUSE Welding Co., 6 Pelham St., Boston, Mass.

WELDRITE Co., 350 Jackson Ave., Long Island City, N. Y.

WESTERN Drop Forge Co., Marion, Ind.
(See page 473.)

WESTERN Welding & Mfg. Co., 557 W. Jackson Blvd., Chicago, Ill.

WILKES-BARRE Welding Co., 6 W. Ross St., Wilkes-Barre, Pa.

WORCESTER Pressed Steel Co., Worcester, Mass.
(See page 157.)

ELECTRIC WELDING

AKRON-SELLE Co., High & Chestnut Sts., Akron, O.

BECKLEY Perforating Co., C. R. R. Ave., Garwood, N. J.

BILLINGS & Spencer Co., Hartford, Conn.

DETROIT Electric Welder Co., 255 Lafayette Ave., W., Detroit, Mich.

ELECTRIC Welding Products Co., Cleveland, O.
(See page 597.)

JACOBS Co., F. L., 451 Guoin St., Detroit, Mich.

LEWIS Electric Welding & Mfg. Co., 4086 Detroit Ave., Toledo, O.
(See page 439.)

McDOWELL Mfg. Co., 541 Wood St., Pittsburg, Pa.

MICHIGAN Electric Welding Co., 514 Hart Ave., Detroit, Mich.
(See page 596.)

OAKES Pressed Steel Co., Indianapolis, Ind.

STANDARD Welding Co., Cleveland, O.
(See Book Mark.)

THOMSON Electric Welding Co., 161 Pleasant St., Lynn, Mass.

WORCESTER Pressed Steel Co. (Barbers Crossing), Worcester, Mass.

WHEELS

CAST STEEL WHEELS

BUCHANAN Electric Steel Co., Buchanan, Mich.

DAYTON Steel Foundry Co., Dayton, O.

JOHNSON Steel Wheel Corp., 30 Kemble St., Boston, Mass.

MICHIGAN Steel Casting Co., Detroit, Mich.
(See page 213.)

SHELDON Axle & Spring Co., Wilkes-Barre, Pa.
(See page 141.)

WEST Steel Casting Co., 805-13 E. 70th St., Cleveland, O.

PRESSED STEEL WHEELS

BACHEM, Max, 999 Woodward Ave., Detroit, Mich. (Importer.) "Crown Prince."
(See page 465.)

CROWN PRINCE—See Bachem, Max.

CUSTER Coupling Co., Bradford, Pa.

HYDRAULIC Pressed Steel Co., 3164 E. 61st St., Cleveland, O. "Parker."
(See page 289.)

PARKER—See Hydraulic Pressed Steel Co.

SPECIAL PNEUMATIC, SPRING AND EMERGENCY WHEELS

AMERICAN Motor Wheel Co., K. of P. Bldg., Crawfordsville, Ind., "Coats."

AUTOMOBILE Spring Wheel Co., 413 W. Broadway, New York, N. Y. "Sipe."

COATS—See American Motor Wheel Co.

DURGIN Auto Wheel Co., Lawrence National Bank Bldg., Lawrence, Kans. "Modlin."

HUB Shock Absorber Wheel Co., Lancaster, Pa.

INDESTRUCTIBLE Wheel Co., 309 E. Walnut St., Lebanon, Ind. "Lofland."

JENKINS Emergency Wheel Co., Mutual Bldg., Richmond, Va.

JOHNSON Steel Wheel Corp., 30 Kemble St., Boston, Mass.

KELSEY Wheel Co., Detroit, Mich.

LEAP Resilient Wheel Co., 2438 Michigan Ave., Chicago, Ill.

LEIB Yielding Wheel Co., 105 McKinley Ave., Middletown, O.

LOFLAND—See Indestructible Wheel Co.

MATHIESEN Spring Cushion Wheel Co., 2332 S. Michigan Ave., Chicago, Ill.

MODLIN—See Durgin Auto Wheel Co.

OSHKOSH—See Pneumatic Hub Wheel Co.

Complete Index to Classification appears on Pages 8 to 26.

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MOTT WIRE WHEELS

Made to Fit

FORD CARS

$20.00 per set of four—ready to attach

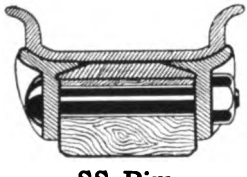
Backed by the Mott guarantee for satisfactory service and permanent satisfaction.

Our liberal selling proposition enables dealers to secure the best of the Ford business, without fear of competition.

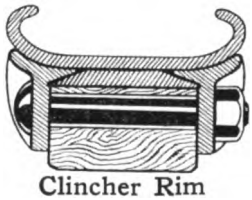
Details Gladly Furnished

The Mott Wheel Works
Utica **New York**

THE FUNK RIM



SS Rim



Clincher Rim

A wonderful Quick Detachable Demountable Rim—possessing a high safety factor, without the many usual complications.

Lightest of all Demountable Rims for size. Easily operated standing up. Backed by the binding Mott guarantee for permanent satisfactory service.

Shipments guaranteed to meet your requirements.

Funk equipment saves MONEY, TIME and WEIGHT. We can prove it.

Made by

THE MOTT WHEEL WORKS **Utica, N. Y.**

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WHEELS (Continued)

SPECIAL PNEUMATIC SPRING AND EMERGENCY WHEELS (Continued)

PECK Wheel Co., 4058 Princeton Ave., Chicago, Ill.

PNEUMATIC Hub Wheel Co., Oshkosh, Wis. "Oshkosh."

SCHICK Wheel & Tire Co., 89 Indiana Ave., Wheeling, W. Va.

SEWELL Cushion Wheel Co., Gratiot Ave. & Beaufait St., Detroit, Mich.

SIPE—See Automobile Spring Wheel Co.

T. S. Wheel & Mfg. Co., 245 Oregon St., Milwaukee, Wis.

TISCHER Spring Wheel Co., Saratoga, Wyo.

URIE, W. T., Independence, Mo.

STEERING WHEELS

AMERICAN Wood Rim Co., Onaway, Mich.

COLEMAN Mfg. Co., 679-85 Atwater St. E., Detroit, Mich.

PERFECTION—**See Prosser Engineering Co.**

PROSSER Engineering Co., 2106 W. Superior Ave., Cleveland, O. "Perfection."

TUCKER Wood Work Co., Sidney, O.

HEATED STEERING WHEELS

INTERSTATE Electric Co., New Orleans, La. "Steerwarms."

MOTORIST Warm Grip Co., Marshall, Tex.

STEERWARMS—See Interstate Electric Co.

WARM Hand Steering Wheel Corp., Poughkeepsie, N. Y.
(See page 531.)

WIRE WHEELS

ASHLEY—See General Rim Co.

DUNLOP Wire Wheel Corp. of America, 2130 Broadway, New York, N. Y.

F. & H. Wire Wheel Co., Columbus, O.
(See page 455.)

GENERAL Rim Co., Swetland Bldg., Cleveland, O. "Ashley."

GREAT Western Mfg. Co., Laporte, Ind. "Lindsay."

HOUK Mfg. Co., Buffalo, N. Y.

KELSEY Wheel Co., Detroit, Mich.

LINDSAY—See Great Western Mfg. Co.

MOTT Wheel Works, Utica, N. Y.
(See page 453.)

PRESTO Inter-Rim Co., 883 Boylston St., Boston, Mass.
(See page 343.)

RUDGE-WHITWORTH—See Standard Roller Bearing Co.

SPRANGER Rim & Wheel Co., Ford Bldg., Detroit, Mich.

STANDARD Roller Bearing Co., 50th St. & Lancaster Ave., Philadelphia, Pa. "Rudge-Whiteworth."

STANDARD Welding Co., Cleveland, O. "Stanweld."
(See Book Mark.)

STANWELD—See Standard Welding Co.

UNIVERSAL Car Equipment Co., 245 John R St., Detroit, Mich.
(See pages 521 and 559.)

UNIVERSAL Welding Co., St. Anne, Ill.

WHITESIDE Wheel Co., Canal & Tenth Sts., Indianapolis, Ind.

WOOD WHEELS

ARCHIBALD Wheel Co., 150 West St., Lawrence, Mass.

AUBURN Wheel & Mfg. Co., Auburn, R. I.

AUTO Wheel Co., Lansing, Mich.
(See page 467.)

BALTIMORE Hub-Wheel & Mfg. Co., Harford Ave. & B. & O. R. R., Baltimore, Md.

BIMEL Spoke & Auto Wheel Co., Portland, Ind.
(See page 465.)

BUCKEYE Wheel Co., Galion, O.

CENTRAL City Wheel Works, Plum & Willkinson Sts., Syracuse, N. Y.

EAMES & Co., A. M., South Framingham, Mass.

EBERLY & Orris Mfg. Co., Mechanicsburg, Pa.

EMPIRE Wheel Works, 174 South St., Utica, N. Y.

HARRIS Co., Union St. & Payson Ave., Easthampton, Mass.

HAYES Wheel Co., Jackson, Mich.

HOOPES Bros. & Darlington, West Chester, Pa.

JAMESTOWN Wheel & Mfg. Co., Jamestown, N. Y.

JONES & Co., Phineas, Newark, N. J.
(See page 477.)

KELSEY Wheel Co., Detroit, Mich.

MEEKER Mfg. Co., Linden & Hoffman Aves., Dayton, O.

MILLAR Wheel Works, 3518-22 N. Clark St., Chicago, Ill.

PRUDDEN & Co., W. K., Lansing, Mich.

SALISBURY Wheel & Mfg. Co., Jamestown, N. Y.
(See page 601.)

SCHWARZ Wheel Co., Margaret St. & Trenton Ave., Philadelphia, Pa.

SHORTSVILLE Wheel Co., Shortsville, N. Y.

STANDARD Wheel Co., 1701 N. 13th St., Terre Haute, Ind.

WAVERLY Co., 139 S. East St., Indianapolis, Ind.

WAYNE Wheel Co., Newark, N. Y.
(See page 477.)

WHEEL & Wood Bending Co., 141 John St., Bridgeport, Conn.

Complete Index to Classification appears on Pages 8 to 26.

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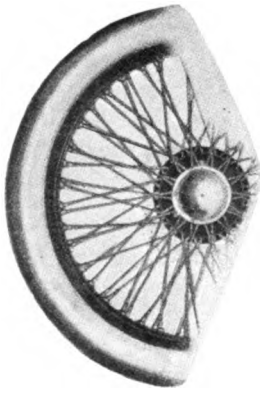


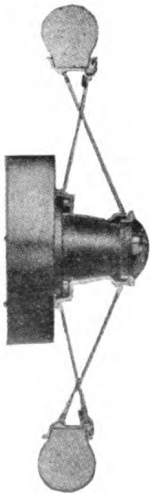
F. and H. Wire Wheels

Two spoke cross-laced

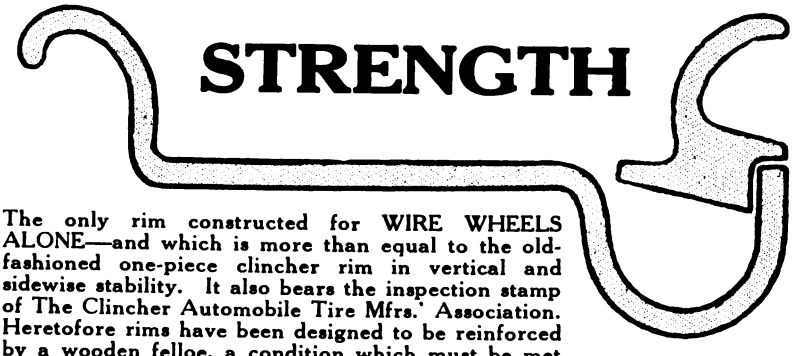
An American product in Type and Material

Built with

F. and H. Special Wire Wheel Rim



A wire wheel can be built only as strong as its rim.

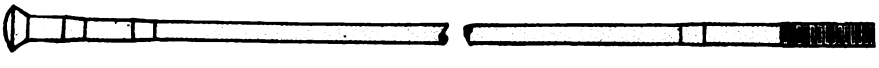


STRENGTH

The only rim constructed for WIRE WHEELS ALONE—and which is more than equal to the old-fashioned one-piece clincher rim in vertical and sidewise stability. It also bears the inspection stamp of The Clincher Automobile Tire Mfrs.' Association. Heretofore rims have been designed to be reinforced by a wooden felloe, a condition which must be met in wire wheel construction. The removable side-ring is secured in such a manner that rim proper is not notched; therefore the rim is not weakened at any one point in its circumference.

The cross-laced construction with straight side Q. D. rims guarantees ample rut clearance and maintains standard tread; the shortness of the wheel's hub permits of two spare wheels being carried, while the automatic self-tightening wheel retaining nut with positive lock, insures absolute safety.

DEMOUNTABLE WHEELS INTERCHANGEABLE ALL AROUND



Next in importance to the rim is the spoke. The swedging of these spokes is of vital importance. It gives the desired resiliency and destroys through the extra diameter it leaves for head and thread any tendency to break at these points. Instead of a weak point just outside of the nipple in the thread, we have a long smaller diameter section especially prepared to absorb the shocks.

STRENGTH—RESILIENCY—LIGHT WEIGHT

The F. & H. Wire Wheel Co., Columbus, O.

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WHIPCORD

UPHOLSTERY WHIPCORD

AMERICAN Mills Co., 17th St. & Fourth Ave., New York, N. Y.

ROY Woolen Co., Watervliet, N. Y.

WATERLOO Woolen Mfg. Co., Waterloo, N. Y.

WHISTLES

EXHAUST WHISTLES

(See Horns, Exhaust)

WICKING

CANDLE WICKING

BISHOP Mfg. Co., Robert (S. Boston), Boston, Mass.

ESTES Mills, Fall River, Mass.

HOFFMAN-CORR Mfg. Co., 594 Broadway, New York, N. Y.

LEES Mfg. So., 320 Broadway, New York, N. Y.

MASSASOIT Mfg. Co., Fall River, Mass.

WESTPORT Mfg. Co., Fall River, Mass.

FELT LUBRICATOR WICKING

BOOTH Felt Co., 440-50 19th St., Brooklyn, N. Y.
(See page 447.)

BRAWLEY, T. R., 85-87 Adams St., Brooklyn, N. Y.
(See page 449.)

WICKS

LAMP WICKS

CONSOLIDATED Duck Co., 86 Worth St., New York, N. Y.

LEES Mfg. Co., 320 Broadway, New York, N. Y.

WIPERS

WIPERS AND POLISHING CLOTHS

(For Cotton Waste—See Waste, Cotton)

AMERICAN Mill Ends Co., Detroit, Mich.

AMERICAN Paper Stock Co., 295 Orleans St., Detroit, Mich.

ARBELLA Waste Co., 1210 Dorchester Ave., Boston, Mass.

CADILLAC Paper Co., E. Grand Blvd. & Hastings St., Detroit, Mich.
(See page 639.)

CHICAGO Sanitary Rag Co., 2139-43 S. Loomis St., Chicago, Ill.

CONSUMERS Paper Co., Detroit, Mich.

DETROIT Sanitary Rag Co., 394 Harper Ave., Detroit, Mich.

DONT-MA—See Hoffman-Corr Mfg. Co.

FULTON Bag & Cotton Mills, Atlanta, Ga.

HAGY Waste Works, J. Milton, 836-42 Swanson St., Philadelphia, Pa.

HOFFMAN-CORR Mfg. Co., 594 Broadway, New York, N. Y. "Dont-Ma."

LYMAN Co., John R., Springfield, Mass.

MILL Remnants Co., 80 West St., New York, N. Y.

NORTH & Son, Jos. W., Sixth St., Elizabeth, N. J.

NORTHWESTERN Sanitary Wiping Rag Co., 1015 Holden St., Chicago, Ill.

REACH Textile Co., A. L., 138 Pearl St., Boston, Mass.

ROWACO—See Royal Waste Co.

ROYAL Waste Co., 146 Oliver St., Boston, Mass. "Rowaco."

WIRE

BOWDEN WIRE

BRETZ Co., J. S., 250 W. 54th St., New York, N. Y. (Importers.)
(See page 469.)

INSULATED WIRE

ACME Rubber Mfg. Co., Trenton, N. J.

AMERICAN Electrical Works, Phillipsdale, R. I.

AMERICAN Steel & Wire Co., 208 S. La Salle St., Chicago, Ill. "Amerite," "Americore."
(See page 457.)

AMERICORE—See American Steel & Wire Co.

AMERITE—See American Steel & Wire Co.

ATLANTIC Insulated Wire & Cable Co., 120 Liberty St., New York, N. Y.

BISHOP Gutta-Percha Co., 420 E. 25th St., New York, N. Y.
(See page 457.)

BOSTON Insulated Wire & Cable Co., Boston, Mass.
(See page 469.)

BOURN Rubber Co., 58 Warren St., Providence, R. I. "Star."

CRESCENT Insulated Wire & Cable Co., Olden Ave. & Taylor St., Trenton, N. J.

EAGLE—See Marion Insulated Wire & Rubber Co.

EMPIRE Rubber & Tire Co., Mulberry St. & Clinton Ave., Trenton, N. J.

GENERAL Electric Co., Schenectady, N. Y.

GOODRICH Co., B. F., Akron, O.

GROSSMAN Mfg. Co., Emil, Bush Terminal, Brooklyn, N. Y. "Red Rib."

HABIRSHAW Wire Co., 1 Madison Ave., New York, N. Y.

HAZARD Mfg. Co., 81 E. Ross St., Wilkes-Barre, Pa.

INDIANA Rubber & Insulated Wire Co., Jonesboro, Ind.

Complete Index to Classification appears on Pages 8 to 26.

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AMERICAN STEEL & WIRE CO.

MAKERS OF

AMERITE

AND

AMERICORE

RUBBER COVERED WIRE—IGNITION WIRE—LAMP CORD

and bare copper and insulated wires
and cables for all electrical purposes.

SALES OFFICES

CHICAGO, 208 S. La Salle St.
NEW YORK, 30 Church St.
WORCESTER, 94 Grove St.
BOSTON, 120 Franklin St.
BALTIMORE, MD.
PITTSBURGH, Frick Bldg.
BUFFALO, N. Y., 337 Washington St.
WILKESBARRE, PA.
CINCINNATI, Union Trust Bldg.
CLEVELAND, Western Reserve Bldg.
DETROIT, Foot of First Street
ST. LOUIS, 3rd National Bank Building
BIRMINGHAM, ALA.
DENVER, 1st National Bank Building
ST. PAUL-MINNEAPOLIS, Pioneer Bldg., St. Paul
SALT LAKE CITY, Western Bank Bldg.

UNITED STATES STEEL PRODUCTS COMPANY

Export Department, New York, 30 Church St.
Pacific Coast Dep't, San Francisco, Rialto Bldg.
Portland, Sixth and Alder Sts.
Seattle, 4th Ave., South and Conn. St.
Los Angeles, Jackson and Central Aves.

We exhibit at the Panama-Pacific Exposition, San Francisco, 1915, in the Palace of Mines and Metallurgy

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WIRE (Continued)

INSULATED WIRE (Continued)

KERITE Insulated Wire & Cable Co., 30 Church St., New York, N. Y.

MARION Insulated Wire & Rubber Co., Eighth St., & Big Four Ry., Marion, Ind. "Eagle."

NATIONAL India Rubber Co., Bristol, R. I.

NEW York Insulated Wire Co., 114 Liberty St., New York, N. Y.

OKONITE Co., 253 Broadway, New York, N. Y.

PACKARD Electric Co., Warren, O.

RED RIB—See Grossman Mfg. Co.

ROEBLINGS Sons Co., John A., Trenton, N. J.

SAFETY Insulated Wire & Cable Co., 114 Liberty St., New York, N. Y.

SIMPLEX Wire & Cable Co., 201 Devonshire St., Boston, Mass.

STANDARD Rubber & Cable Co., Bridgeport, Conn.

STANDARD Underground Cable Co., Westinghouse Bldg., Pittsburg, Pa.

STAR—See Bourn Rubber Co.

PHOSPHOR BRONZE WIRE

AMERICAN Brass Co. (Benedict & Burnham Branch), Waterbury, Conn.

OMEGA—See Riverside Metal Co.

PHOSPHOR Bronze Smelting Co., 2200 Washington Ave., Philadelphia, Pa. (See page 491.)

RIVERSIDE Metal Co., Riverside, N. J. "Omega."

STEEL SPRING WIRE

AMERICAN Steel & Wire Co., 208 S. La Salle St., Chicago, Ill. (See page 457.)

HELMUTH Co., L., 17 Battery Pl., New York, N. Y. (Importers.)

MORGAN Spring Co., Worcester, Mass.

NASH Co., George, 217 Pearl St. New York, N. Y. (Importers.) "Ultra Capital." (See page 433.)

ROEBLINGS Sons Co., John A. Trenton, N. J.

SPENCER Wire Co., Worcester, Mass.

TRENTON Iron Co., Trenton, N. J.

ULTRA CAPITAL—See Nash Co.

WOOL

STEEL WOOL

AMERICAN Steel Wool Mfg. Co., 451 Greenwich St., New York, N. Y.

BUEHNE Steel Wool Co., 93 Nassau St., New York, N. Y.

RHODES & Co., J. H., 162 W. Kinzie St., Chicago, Ill.

WRENCHES

VALVE PLUNGER WRENCHES

(For taking Plungers out of Tire Valves)

CODMAN & Shurtleff, 120 Boylston St., Boston, Mass.

Manufacturers are requested to send us copies of all catalogues as soon as issued. This will assist us in listing your name in this Directory under the proper classification or classifications and will then be placed in our file for reference.

THE AUTOMOBILE TRADE DIRECTORY
243-249 West 39th Street New York

Complete Index to Classification appears on Pages 8 to 26.

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Machinery, Tools, Shop Equipment and Supplies

PART III

Classified Lists of the Manufacturers of Machinery and Tools, and of Factory, Garage, Repair Shop and Foundry Equipment and Supplies

A complete index to classifications appears on pages 8 to 26

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PENN SPRINGS

ELASTICITY, STRENGTH
AND UNIFORMITY

MEANS SATISFACTION

These results come from our scientific treatment of the steel combined with skilled workmanship.

PENN SPRING WORKS

R. K. DAVIS, Sales Manager

Sales Office
Majestic Bldg., Detroit, Mich.

Factory
Baldwinsville, N. Y.

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Part III

MACHINERY, TOOLS, SHOP EQUIPMENT AND SUPPLIES

ANVILS

BLACKSMITHS AND MACHINISTS ANVILS

BALDWIN, Tuthill & Bolton, Grand Rapids, Mich.

COLUMBIAN Hardware Co., Cleveland, O.

COLUMBUS Forge & Iron Co., Columbus, O. "Trenton."

EAGLE—See Fisher & Norris.

FISHER & Norris, Trenton, N. J. "Eagle."

HAY-BUDDEN Mfg. Co., Brooklyn, N. Y.

ILLINOIS Iron & Bolt Co., Carpentersville, Ill.

PETER WRIGHT—See Wiebusch & Hilger.

TRENTON—See Columbus Forge & Iron Co.

WIEBUSCH & Hilger, New York, N. Y. (Importers.) "Peter Wright."

BALLS

BURNISHING BALLS

ABBOTT Ball Co., Hartford, Conn.

BARRELS

TUMBLING BARRELS

ABBOTT Ball Co., Hartford, Conn.

BAIRD Machine Co., Bridgeport, Conn.

BARNETT Foundry Co., Oscar, Irvington, N. J.

CALUMET Foundry Equipment Co., Harvey, Ill.

GILMOUR, J., New York, N. Y.

GLOBE Machine & Stamping Co., 1250 W. 76th St., Cleveland, O. (See page 81.)

HENDERSON Bros., Waterbury, Conn.

McCORMICK Co., J. S., Pittsburg, Pa.

NORTHERN Engineering Works, 2 Chene St., Detroit, Mich.

PAXSON Co., J. W., 1019 N. Delaware Ave., Philadelphia, Pa. (See page 523.)

PERKINS Co., Henry, Bridgewater, Mass.

ROYERSFORD Foundry & Machine Co., Royersford, Pa.

SLY Mfg. Co., W. W., Cleveland, O.

WHITING Foundry Equipment Co., Harvey, Ill.

BARS

BORING BARS

ALLEN & Curtis Co., Mishawaka, Ind. "Simpl."

ARMSTRONG Bros. Tool Co., 304 N. Francisco Ave., Chicago, Ill. (See page 541.)

CELFOR Tool Co., Buchanan, Mich.

CLOUGH, R. M., Tolland, Conn.

DAVIS Boring Tool Co., St. Louis, Mo.

KRIEGER Tool & Mfg. Co., Grand Rapids, Wis.

MARVIN & Casler Co., Canastota, N. Y.

O. K. Tool Holder Co., Shelton, Conn.

READY Tool Co., Bridgeport, Conn. "Red-E."

RED-E—See Ready Tool Co.

SIMPL—See Allen & Curtis Co.

THOMPSON & Son Co., Henry G., New Haven, Conn.

UNIVERSAL Boring Machine Co., Hudson Mass.

BASKETS

DIPPING BASKETS

SMITH, Edward F., New Haven, Conn.

Complete Index to Classification appears on Pages 8 to 26.

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BEARINGS

OILLESS BEARINGS

ARGUTO Oilless Bearing Co., Philadelphia, Pa.

BELLOWS

HAND BELLOWS

(Blacksmiths and Molders)

BRAND Co., S. H., Chicago, Ill.

CHAMPION—See Paro. E.

CHRISTEN Bellows & Mfg. Co., St. Louis, Mo.

DOBSON, Wm., Canastota, N. Y.

HILL & Griffith Co., Cincinnati, O.

OSBORN Mfg. Co., Cleveland, O.

PARO, E., Chicago, Ill. "Champion."

WOODASON, Thos., Philadelphia, Pa.

BENDERS

ANGLE BENDERS

(Hand Power)

BERTSCH & Co., Cambridge City, Ind.

EXCELSIOR Tool & Machine Co., East St Louis, Ill. "X L C R."

HINMAN & Co., D. A., Sandwich, Ill.

WALLACE Supply Co., Chicago, Ill.

X L C R—See Excelsior Tool & Machine Co.

BITS

AUGER BITS

BROWN & Co., R. H,. New Haven, Conn. "Clark's."

CHESTER Mfg. Co., Chester, Conn.

CLARK'S—See Brown & Co.

CONNECTICUT Valley Mfg. Co., Centerbrook, Conn.

DEUSE, J. S., Chester, Conn.

FOREST City Bit & Tool Co., Rockford, Ill.

FORSTNER—See Progressive Mfg. Co.

GREENLEE Bros. & Co., Rockford, Ill.

HUMPHREYSVILLE Mfg. Co., Seymour, Conn.

IRWIN Auger Bit Co., Wilmington, O.

IVES Mfg. Co., W. A., Wallingford, Conn. "Mephisto."

JENNINGS & Co., C. E., New York, N. Y.

KILBORN & Bishop Co., New Haven, Conn. "Lavigne."

LAVIGNE—See Kilborn & Bishop Co.

MEPHISTO—See Ives Mfg. Co.

OHIO Tool Co., Charleston, W. Va.

PROGRESSIVE Mfg. Co., Torrington, Conn. "Forstner."

RUSSELL-JENNINGS Mfg. Co., Chester, Conn.

SNELL Mfg. Co., Fiskdale, Mass.

SWAN Co., Jas., Seymour, Conn.

BLACKBOARDS

COMPOSITION BLACKBOARDS

HAMMETT Co., J. L., Brooklyn, N. Y. (See page 465.)

BLADES

HACK SAW BLADES

(For Hack Saw Frames—See Frames, Hack Saw)

A. A. A.—See Atkins & Co.

ARROW HEAD—See Jennings & Co.

ATKINS & Co., E. C., Indianapolis, Ind. "A. A. A."

BOSTON Saw & Tool Co., Boston, Mass. "Knoxall," "Champion."

CHAMPION—See Boston Saw & Tool Co.

CHROMOL—See Disston & Sons.

DIAMOND Saw & Stamping Works, Buffalo, N. Y. "Sterling."

DISSTON & Sons, Henry, Philadelphia, Pa. "Chromol."

EUREKA-YANKEE—See Thompson & Son Co.

GOODELL-PRATT Co., Greenfield, Mass.

GRIFFIN Co., G. W., Franklin, N. H.

IRVINGTON Mfg. Co., Irvington, N. J.

JENNINGS & Co., C. E., New York, N. Y. "Arrow Head."

KNOXALL—See Boston Saw & Tool Co.

MASSACHUSETTS Saw Works, Springfield, Mass. "Victor."

MILFORD—See Thompson & Son Co.

MILLERS Falls Co., New York, N. Y. "Star."

OLDHAM & Sons, Joshua, New York, N. Y.

QUALITY Saw & Tool Works, Springfield, Mass.

RACINE Tool & Machine Co., Racine, Wis.

SIMONDS Mfg. Co., Fitchburg, Mass.

SIMPLEX Tool & Supply Co., Boston, Mass.

STAPF & Co., John B., Dunkirk, N. Y.

STAR—See Millers Falls Co.

STERLING—See Diamond Saw & Stamping Works.

TT.—See Thompson & Son Co.

THOMPSON & Son Co., Henry G., New Haven, Conn. "Milford," "Eureka-Yankee," "XL," "TT."

UNIVERSAL—See West Haven Mfg. Co.

UTILITY—See West Haven Mfg. Co.

VICTOR—See Massachusetts Saw Works.

XL—See Thompson & Son Co.

WEST Haven Mfg. Co., New Haven, Conn "Universal," "Utility."

BLOCKS

CHAIN BLOCKS

(See Cranes, Portable)

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Illustration to right shows P. & W. Taper Hand Tap, after being forced by power nearly through a nut in which the hole was purposely drilled considerably smaller than the root diameter of the tap.

P. & W.
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Freest Cutting
Longest Life

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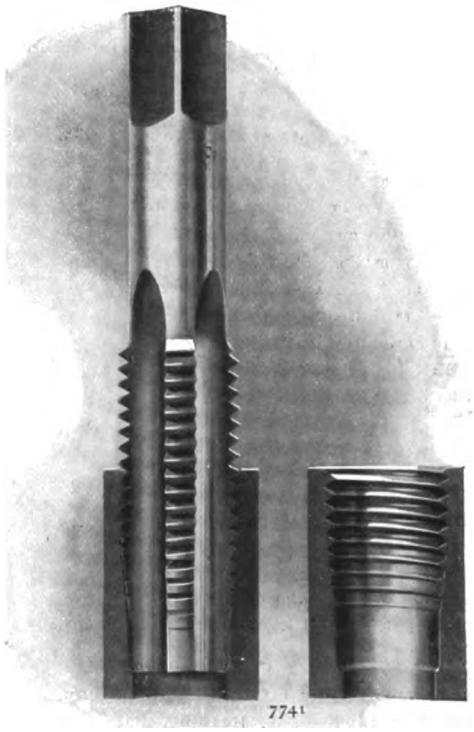

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BLOWERS

PRESSURE BLOWERS

ABC—See American Blower Co.

AMERICAN Blower Co., Detroit, Mich. "ABC."

AMERICAN Gas Furnace Co., 24 John St., New York, N. Y. (See page 155.)

BUFFALO Forge Co., Buffalo, N. Y.

CANEDY-OTTO Mfg. Co., Chicago Heights, Ill. "Royal," "Western Chief."

CHAMPION Blower & Forge Co., Lancaster, Pa.

CONNERSVILLE Blower Co., Connersville, Ind.

HOYSRADT & Case, Kingston, N. Y.

NATIONAL Blower Works, Milwaukee, Wis.

NEW York Blower Co., Chicago, Ill.

PIQUA Blower Co., Piqua, O.

ROOTS Co., P. H. & F. M., Connersville, Ind.

ROYAL—See Canedy-Otto Mfg. Co.

U. S. Gas Machine Co., Muskegon, Mich.

WESTERN CHIEF—See Canedy-Otto Mfg. Co.

WILBRAHAM-GREEN Blower Co., Pottstown, Pa.

BOBS

PLUMB BOBS

ACME—See Millers Falls Co.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BROWN & Sharpe Mfg. Co., Providence, R. I.

PECK, Stow & Wilcox Co., Southington, Conn.

READING Hardware Co., Reading, Pa.

STANLEY Rule & Level Co., New Britain, Conn.

STARRETT Co., L. S., Athol, Mass.

BOXES

ANNEALING AND CASE HARDENING BOXES

HESS Steel Castings Co., Bridgeton, N. J.

KNOX Pressed & Welded Steel Co., Pittsburg, Pa.

LEETONIA Boiler Co., Leetonia, O.

McNEIL & Bro. Co., Jas., Pittsburg, Pa.

NATIONAL Mfg. Co., Pittsburg, Pa.

OHIO Mfg. Co., Painesville, O.

WHITING Foundry Equipment Co., Harvey, Ill.

HOSE BOXES

HALE Electric & Engineering Co., Cleveland, O. (See page 465.)

MITRE BOXES

ACME—See Millers Falls Co.

AYER—See Marsh Co.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J. "Dorn's."

DORN'S—See Braunsdorf-Mueller Co.

GOODELL Mfg. Co., Greenfield, Mass. "Greenfield."

GREENFIELD—See Goodell Mfg. Co.

LANGDON—See Marsh Co.

LANGDON—See Millers Falls Co.

MARSH Co., H. C., Rockford, Ill. "Langdon," "Ayer."

MILLERS Falls Co., New York, N. Y "Langdon," "Acme."

OLMSTED'S Son, L. H., Hasbrouck Heights, N. J.

ROCKFORD Mitre Box Co., Rockford, Ill.

STANLEY Rule & Level Co., New Britain Conn.

SHEET METAL TOTE BOXES

CLARK Co., W. J., Salem, O.

CLEVELAND Wire Spring Co., Cleveland, O

HETTS Co., Detroit, Mich.

HART & Hutchinson Co., New Britain, Conn.

KILBOURNE & Jacobs Mfg. Co., Columbus, O

LEETONIA Boiler Co., Leetonia, O.

LYON Metallic Mfg. Co., Aurora, Ill.

MERRITT & Co., Camden, N. J.

OHIO Mfg. Co., Painesville, O.

BRACES

BIT BRACES

AMERICAN—See Turner & Deegan.

BARBER—See Millers Falls Co.

BARBERS—See Turner & Deegan.

FRAY Co., John S., Bridgeport, Conn.

GOODELL-PRATT Co., Greenfield, Mass.

HOLDALL—See Millers Falls Co.

LANCASTER Machine & Knife Works, Lancaster, N. Y.

MAYHEW Co., H. H., Shelburne Falls, Mass.

MILLERS Falls Co., New York, N. Y. "Barber," "Holdall."

PECK, Stow & Wilcox Co., Southington, Conn.

STANLEY Rule & Level Co., New Britain, Conn.

TURNER & Deegan, Bristol, Conn. "American," "Barbers."

BRASS

BRAZING BRASS

ALL-METALS Co., Box 34, N. End Station, Detroit, Mich. (See page 477.)

AMERICAN Brass Co. (Waterbury Brass Branch), Waterbury, Conn.

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BRASS (Continued)

BRAZING BRASS (Continued)

BRIDGEPORT Brass Co., P. O. Station L., Bridgeport, Conn. (See page 323.)

CRESCENT—See North American Smelting Co.

LISSBERGER & Son, Marks, Long Island City, N. Y.

NORTH American Smelting Co., Philadelphia, Pa. "Crescent."

BROOMS

STEEL WIRE BROOMS

(For cleaning garage floors)

AMERICAN Wire Brush Co., New York, N. Y. "Minerva."

MINERVA—See American Wire Brush Co.

OSBORN Mfg. Co., Cleveland, O.

BRUSHES

FOUNDRY AND SHOP BRUSHES

CAPITOL—See Indianapolis Brush & Broom Co.

FLINT, Warren F., Boston, Mass.

INDIANAPOLIS Brush & Broom Co., Indianapolis, Ind. "Capitol."

MASON Brush Works, Worcester, Mass.

OSBORN Mfg. Co., Cleveland, O.

PAINT AND VARNISH BRUSHES

AERON—See De Vilbiss Mfg. Co.

BOARS HEAD—See Fisher-Mitchell Co.

BRADLEY & Smith, New York, N. Y.

BURTON & Co., A. E., Boston, Mass.

CLINTON & Co., E., Philadelphia, Pa.

DE VILBISS Mfg. Co., Toledo, O. "Aeron."

DEVOE & C. T. Raynolds Co., F. W., New York, N. Y.

ECLIPSE Air Brush & Compressor Co., Newark, N. J.

FISHER-MITCHELL Co., New York, N. Y. "Boars Head."

FRENCH & Co., Samuel H., Philadelphia, Pa.

GERTS, Lumbard & Co., Chicago, Ill.

HANLON & Goodman Co., New York, N. Y.

LEDERER Co., F. J., Buffalo, N. Y. "Presto."

LUCAS & Co., John, Philadelphia, Pa.

MILES Bros. & Co., New York, N. Y.

MURPHY, Leavens & Co., Boston, Mass.

NIAGARA Devices, Buffalo, N. Y.

OSBORN Mfg. Co., Cleveland, O.

PACKARD Co., A., Boston, Mass.

PRESTO—See Lederer Co.

RODRIGUEZ, R. E., New York, N. Y.

RUBBERSET Co., Newark, N. J.

THAYER & Co., P. E. Pawtucket, R. I.

THUM, Chas. D., Philadelphia, Pa.

UNITED Brush Manufactories, New York, N. Y.

WHITING-J. J. ADAMS Co., John L., Boston, Mass.

VARNISH BRUSHES

(See Brushes, Paint and Varnish)

BUFFERS

ELECTRIC PORTABLE BUFFERS

(See Drills, Electric Portable)

BULLDOZERS

AJAX Mfg. Co., Cleveland, O.

LONG & Allstatter Co., Hamilton, O.

NILES-BEMENT-POND Co., New York, N. Y.

ROCK River Machine Co., Janesville, Wis.

WILLIAMS, White & Co., Moline, Ill.

CALIPERS

CALIPERS AND DIVIDERS

(For Micrometer Calipers—See Micrometers)

ATHOL Machine Co., Athol, Mass.

BILLINGS & Spencer Co., Hartford, Conn.

BROWN & Sharpe Mfg. Co., Providence, R. I

COLUMBIA—See Smith, E. G.

COPELANDS—See Eagan, Thos. F.

EAGAN, Thos. F., Worcester, Mass. "Copelands."

FAY—See Starrett Co.

GOODELL-PRATT Co., Greenfield, Mass.

JOHNSON, Wm., Newark, N. J.

LOWENTRAUT Mfg. Co., P., Newark, N. J.

PECK, Stow & Wilcox Co., Southington, Conn.

SMITH, E. G., Columbia, Pa. "Columbia."

STARRETT Co., L. S., Athol, Mass. "Fay," "Yankee."

UNION Caliper Co., Orange, Mass.

YANKEE—See Starrett Co.

CANS

GASOLINE CANS

(For Garage use)

ATLANTIC Stamping Co., Rochester, N. Y.

BEMAN Automatic Oil Can Co., Meadville, Pa

CENTRAL Stamping Co., New York, N. Y.

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CANS (Continued)

GASOLINE CANS (Continued)

DELPHOS Mfg. Co., Delphos, O.

DOVER Stamping & Mfg. Co., Cambridge, Mass.
(See page 139.)

JUSTRITE Mfg. Co., Chicago, Ill.

NATIONAL Enameling & Stamping Co., New York, N. Y.

NON-EXPLOSIVE Can Co., Chicago, Ill. "Peerless."

PEERLESS—See Non-Explosive Can Co.

ROCHESTER Can Co., Rochester, N. Y.

SEXTON Can Co., Boston, Mass.

VOGEL & Bros., Wm., Brooklyn, N. Y.

WALLMAN Mfg. Co., Milwaukee, Wis.

WASTE CANS

(Receptacles for oily and dirty waste)

ATLANTIC Stamping Co., Rochester, N. Y.

AUTO Metal Co., Springfield, Mass.

CENTRAL Stamping Co., New York, N. Y.

CLARK Co., W. J., Salem, O.

CLEVELAND Wire Spring Co., Cleveland, O.

DELPHOS Mfg. Co., Delphos, O.

DIAMOND State Fibre Co., Elsmere, Del.
(See page 165.)

DOVER Stamping & Mfg. Co., Cambridge, Mass.
(See page 139.)

DURLACH, I., New York, N. Y.

GEM Stamped Steel Co., Boston, Mass.

JUSTRITE Mfg. Co., Chicago, Ill.

KOVEN & Bro., L. O., 50 Cliff St., New York, N. Y.
(See page 403.)

LITTLEFORD Bros., Cincinnati, O.

McCLINTOCK & Irvine, Pittsburg, Pa.

NACEFAS—See Wilson & Co.

NO-SHAMMY Products Co., Cleveland, O.

ROCHESTER Can Co., Rochester, N. Y.

WALL Mfg. Supply Co., P., Pittsburg, Pa.

WILSON & Co., F. Cortez, Chicago, Ill. "Nacefas."

CASES

BOLT AND SCREW CASES

AMERICAN Bolt & Screw Case Co., Dayton, O.

CHAPLETS

FOUNDRY CHAPLETS

BURDICK & Son, Albany, N. Y.

CHAMPION Machine & Forging Co., 3725 E. 78th St., Cleveland, O.
(See page 633.)

CLEVELAND Chaplet & Mfg. Co., Cleveland, O.

CRESCENT Brass & Pin Co., Detroit, Mich.

GEM Mfg. Co., Pittsburg, Pa.

HASKINS—See Hill & Griffith Co.

HILL & Griffith Co., Cincinnati, O. "Peerless," "Haskins."

LINDSAY & Co., W. W., Philadelphia, Pa.

PAWTUCKET Mfg. Co., Pawtucket, R. I.

PEERLESS—See Hill & Griffith Co.

PHILADELPHIA Chaplet & Mfg. Co., Philadelphia, Pa.

SHANAFELT Mfg. Co., Canton, O.

UNITED States Chaplet & Supply Co., New York, N. Y.

CHISELS

CAPE CHISELS

(See Chisels, Cold and Cape)

COLD AND CAPE CHISELS

ATHA Tool Co., Newark, N. J.

BEALL Bros., Alton, Ill.

BILLINGS & Spencer Co., Hartford, Conn.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BREWER Bros. Co., Philadelphia, Pa.

BUCK Bros., Milbury, Mass.

BUFFUM Tool Co., Louisiana, Mo.

CARVER Tool Works, Spring Valley, N. Y.

CINCINNATI Tool Co., Norwood, O. "Hargrave."

CRONK & Carrier Mfg. Co., Elmira, N. Y.

DIAMOND—See Whitman & Barnes Mfg. Co

DREW & Co., C., Kingston, Mass.

EVANSVILLE Tool Works, Evansville, Ind

HARGRAVE—See Cincinnati Tool Co.

HUBBARD & Co., Pittsburg, Pa.

JOHNSON, Wm., Newark, N. J.

K. & B.—See Kilborn & Bishop Co.

KILBORN & Bishop Co., New Haven, Conn "Silex," "K. & B."

KLEIN-LOGAN Co., Pittsburg, Pa.

KRAEUTER & Co., Newark, N. J.

LOWENTRAUT Mfg. Co., P., Newark, N. J

MARCY Tool Works, Putnam, Conn.

MOUND Tool Co., Seventh & Hickory Sts., St. Louis, Mo.
(See page 475.)

NOONAN Tool & Machine Co., A. S., Rome N. Y.

OHIO Tool Co., Charleston, W. Va.

PECK, Stow & Wilcox Co., Southington, Conn

RED HEAD—See S. & I. Co.

S. & I. Co., Springfield, Mass. "Red Head."

SCHUTTE & Co., E. G., Cincinnati, O.

SHARPENEZY—See Smith & Co.

SILEX—See Kilborn & Bishop Co.

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COLD AND CAPE CHISELS (Continued)

SMITH & Co., H. D., Plantsville, Conn. "Sharpenezy."

SNELL Mfg. Co., Fiskdale, Mass.

STORTZ & Son, John, Philadelphia, Pa.

SYRACUSE Twist Drill Co., Syracuse, N. Y.

TUCK Mfg. Co., Brockton, Mass.

VAN DOREN Mfg. Co., Chicago Heights, Ill. "Vandor."

VANDOR—See Van Doren Mfg. Co.

VAUGHAN & Bushnell Mfg. Co., Chicago, Ill.

VERONA Tool Works, Pittsburg, Pa.

VLCHEK Tool Co., Cleveland, O.

WARNER Hammer Co., Cromwell, Conn.

WHITE Co., L. & I. J., Buffalo, N. Y.

WHITMAN & Barnes Mfg. Co., Akron, O. "Diamond."

WOODWORKERS CHISELS AND GOUGES

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BUCK Bros., Milbury, Mass.

GREENLEE Bros. & Co., Rockford, Ill.

JENNINGS & Co., C. E., New York, N. Y.

MACK & Co., Rochester, N. Y.

OHIO Tool Co., Charleston, W. Va.

PECK, Stow & Wilcox Co., Southington, Conn.

RED HEAD—See S. & I. Co.

S. & I. Co., Springfield, Mass. "Red Head."

SWAN Co., Jas., Seymour, Conn.

WHITE Co., L. & I. J., Buffalo, N. Y.

WINSTED Edge Tool Works, Winsted, Conn.

CHUCKS

BORING MILL CHUCKS

GISHOLT Machine Co., Madison, Wis

HORTON & Son Co., E., Windsor Locks, Conn.

UNION Mfg. Co., New Britain, Conn.

WESTCOTT Chuck Co., Oneida, N. Y.

DRILL CHUCKS

ADJUSTABLE Collet Co., Cleveland, O.

ALMOND Mfg. Co., T. R., 1 Maple Ave., Ashburnham, Mass. **(See page 537.)**

AMERICAN Specialty Co., Chicago, Ill.

AUTOMATIC Drill Chuck Corp., Detroit, Mich. "Quictite."

BROWN & Co., R. H., New Haven, Conn. "Reid."

BUTLER Chuck Co., Greenfield, Mass.

CELFOR Tool Co., Buchanan, Mich.

CUSHMAN Chuck Co., Hartford, Conn.

DETROIT Twist Drill Co., 657-69 Fort St., Detroit, Mich. "Graham." **(See page 489.)**

GOODELL Mfg. Co., Greenfield, Mass. "Greenfield."

GOODELL-PRATT Co., Greenfield, Mass.

GRAHAM—See Detroit Twist Drill Co.

GREENFIELD—See Goodell Mfg. Co.

GRONKVIST Drill Chuck Co., Jersey City, N. J. "Kupke."

HORTON & Son Co., E., Windsor Locks, Conn "Morrow."

JACOBS Mfg. Co., Hartford, Conn.

KIPNIS Co., New York, N. Y.

KUPKE—See Gronkvist Drill Chuck Co.

LITTLE GIANT—See Westcott Chuck Co.

McCROSKY Reamer Co., Meadville, Pa. "Wizard."

MAGIC—See Modern Tool Co.

MILLER'S Falls Co., New York, N. Y.

MODERN Tool Co., Erie, Pa. "Magic."

MORROW—See Horton & Son Co.

MORSE Twist Drill & Machine Co., New Bedford, Mass.

NATIONAL—See Oneida National Chuck Co.

NEW BRITAIN—See Union Mfg. Co.

ONEIDA—See Westcott Chuck Co.

ONEIDA National Chuck Co., Oneida, N. Y. "National."

PRATT Chuck Co., Frankfort, N. Y

PRESTO—See Whitney Mfg. Co.

QUICTITE—See Automatic Drill Chuck Corp.

REID—See Brown & Co.

SKINNER Chuck Co., New Britain, Conn.

STANDARD Tool Co., Cleveland, O.

UNION Mfg. Co., New Britain, Conn. "New Britain."

WAHLSTROM Tool Co., Brooklyn, N. Y.

WEAVER Mfg. Co., Springfield, Ill.

WESTCOTT Chuck Co., Oneida, N. Y. "Little Giant," "Oneida."

WHITNEY Mfg. Co., Hartford, Conn. "Presto." **(See page 115.)**

WHITON Machine Co., D. E., New London, Conn.

WIARD, F., Detroit, Mich.

WIZARD—See McCrosky Reamer Co.

LATHE CHUCKS

AMERICAN Tool & Machine Co., Boston, Mass.

CUSHMAN Chuck Co., Hartford, Conn.

HOGGSON & Pettis Mfg. Co., New Haven, Conn. "Sweetland."

HORTON & Son Co., E., Windsor Locks, Conn.

KIPNIS Co., New York, N. Y.

ONEIDA National Chuck Co., Oneida, N. Y.

SKINNER Chuck Co., New Britain, Conn.

SWEETLAND—See Hoggson & Pettis Mfg Co.

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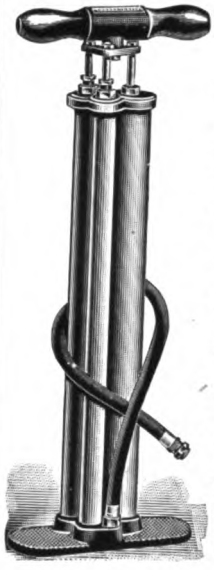

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WESTCOTT Chuck Co., Oneida, N. Y.
WHITON Machine Co., D. E., New London, Conn.

MAGNETIC CHUCKS

D. & W. Fuse Co., Providence, R. I.
HEALD Machine Co., Worcester, Mass.
WALKER & Co., O. S., Worcester, Mass.

MILLING MACHINE CHUCKS

HORTON & Son Co., E., Windsor Locks, Conn.
ONEIDA National Chuck Co., Oneida, N. Y.
SKINNER Chuck Co., New Britain, Conn.
WESTCOTT Chuck Co., Oneida, N. Y.

PLANER CHUCKS

BARTLETT, Edwin E., Boston, Mass.
HORTON & Son Co., E., Windsor Locks, Conn.
JORDAN—See Oneida National Chuck Co.
ONEIDA National Chuck Co., Oneida, N. Y. "Jordan."
SKINNER Chuck Co., New Britain, Conn.
UNION Mfg. Co., New Britain, Conn.

PNEUMATIC CHUCKS

AEROCHUCK—See Manufacturers Equipment Co.
MANUFACTURERS Equipment Co., Chicago, Ill. "Aerochuck."

SCREW MACHINE CHUCKS

HORTON & Son Co., E., Windsor Locks, Conn.
ONEIDA National Chuck Co., Oneida, N. Y.

CLAMPS

MACHINISTS CLAMPS

ATHOL Machine Co., Athol, Mass.
BILLINGS & Spencer Co., Hartford, Conn.
BROWN & Sharpe Mfg. Co., Providence, R. I.
CINCINNATI Tool Co., Norwood, O. "Hargrave."
GOODELL-PRATT Co., Greenfield, Mass.
HARGRAVE—See Cincinnati Tool Co.
HOWELL & Murray, Waverly, N. Y.
LE COUNT, Wm. G., S. Norwalk, Conn.
MARK Mfg. Co., Chicago, Ill.
MASSEY Vise Co., Chicago, Ill.
PAWTUCKET Mfg. Co., Pawtucket, R. I.
PHOENIX Hardware Co., Buffalo, N. Y.
STARRETT Co., L. S., Athol, Mass.
TAYLOR Mfg. Co., James L., Poughkeepsie, N. Y.
WILLIAMS & Co., J. H., Brooklyn, N. Y.

WOODWORKERS CLAMPS

ADVANCE Mfg. Co., Racine, Wis. "Rej-Klamp."
ALDRICH Co., Wm. K., Lowell, Mass.
BATAVIA Clamp Co., Batavia, N. Y. "Colts."
BAY STATE—See Cutter, Geo. A.
BLISS Mfg. Co., R., Pawtucket, R. I.
BUFFALO—See Josef Mfg. Co.
CINCINNATI Tool Co., Norwood, O. "Hargrave."
COLTS—See Batavia Clamp Co.
CUTTER, Geo. A., Taunton, Mass. "Bay State." (See page 559.)
DANN Bros. & Co., New Haven, Conn.
DAYTON Malleable Iron Co., Dayton, O.
DETROIT Screw Works, Detroit, Mich. "Reno." (See page 347.)
EAGLE—See Woodruff & Sons Co.
EBERHARD Mfg. Co., Cleveland, O.
ERIE Stamping & Mfg. Co., Erie, Pa. "Thompson."
GRAND Rapids Hand Screw Co., Grand Rapids, Mich.
HAMMER & Co., Branford, Conn.
HARGRAVE—See Cincinnati Tool Co.
JOSEF Mfg. Co., Chicago, Ill.
MARK Mfg. Co., Chicago, Ill.
MASSEY Vise Co., Chicago, Ill.
MOUNT CARMEL—See Woodruff & Sons Co.
NATIONAL Novelty Corp., New York, N. Y.
OHIO Tool Co., Charleston, W. Va.
OLIVER Machinery Co., Grand Rapids, Mich.
PALMER & Sons, Albert E., Owosso, Mich.
PECK, Stow & Wilcox Co., Southington, Conn.
PHOENIX Hardware Co., Buffalo, N. Y.
REJ-KLAMP—See Advance Mfg. Co.
RENO—See Detroit Screw Works.
SANDUSKY Tool Co., Sandusky, O.
TAYLOR Mfg. Co., James L., Poughkeepsie, N. Y.
THOMPSON—See Erie Stamping & Mfg. Co.
WOODRUFF & Sons Co., Walter W., Mount Carmel, Conn. "Eagle," "Mount Carmel."

CLEANERS

AUTOMOBILE ENGINE CLEANERS

BARNARD Specialty Co., Los Angeles, Cal.
BINKS—See Star Brass Works.

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Cleveland, O.

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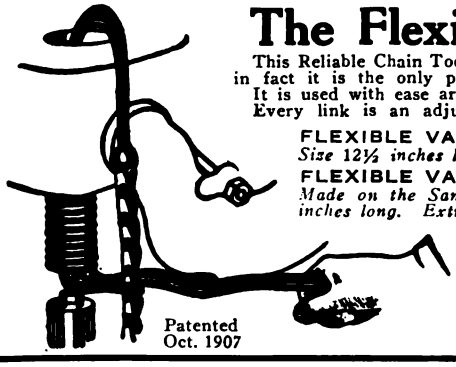

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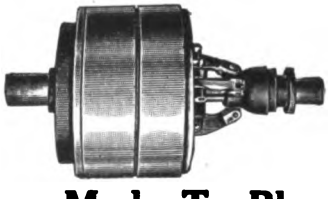
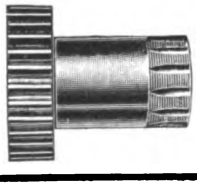


Sliding Transmissions



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CLEANERS (Continued)

AUTOMOBILE ENGINE CLEANERS (Continued)

BISHOP-BABCOCK-BECKER Co., Cleveland, O.

CLEVELAND Faucet Co., Cleveland, O.

CODMAN & Shurtleff, Boston, Mass.

DUNKLEY Co., Kalamazoo, Mich.

LENNOX Chemical Co., Cleveland, O.

PROSPECT Mfg. Co., Prospect, O.

RAPID Auto Cleaner Co., Newark, N. J.

ROHRBACHER Automatic Air Pump Co., Portland, Ore.

ROMORT Valve Co., Seattle, Wash.

STAR Brass Works, Chicago, Ill. "Binks."

STEVENS Mfg. & Supply Co., Chicago, Ill.

TURNER Brass Works, Sycamore, Ill.

WAGNER Specialty Co., New York, N. Y.

MINERAL CLEANERS

BENNETT-O'CONNELL Co., Chicago, Ill.

ELECTRIC Smelting & Aluminum Co., Lockport, N. Y.

HACHMEISTER-LIND Chemical Co., Pittsburg, Pa.

RHODES & Co., J. H., Chicago, Ill.

STEVENS, Frederic B., Detroit, Mich. (See pages 527 and 528.)

CLIPPERS

BOLT AND RIVET CLIPPERS

(Hand Power)

ALLEN-RANDALL—See Porter, H. K.

CAROLUS—See Twin City Specialty Co.

CHAMBERS Bros. Co., Philadelphia, Pa.

COLUMBUS Bolt Works, Columbus, O.

EASY—See Porter, H. K.

ELM CITY—See Schollhorn Co.

HELWIG Mfg. Co., St. Paul, Minn.

METAL Stamping Co., Long Island City, N. Y.

NEW EASY—See Porter, H. K.

PECK, Stow & Wilcox Co., Southington, Conn.

PORTER, H. K., Everett, Mass. "Easy," "New Easy," "Allen-Randall." (See page 475.)

ROBERTS Mfg. Co., Somerville, Mass. "Victor."

SCHOLLHORN Co., Wm., New Haven, Conn. "Elm City."

TWIN City Specialty Co., Sterling, Ill. "Carolus."

VICTOR—See Roberts Mfg. Co.

RIVET CLIPPERS

(See Clippers, Bolt and Rivet)

COLLECTORS

DUST EXHAUST AND COLLECTOR SYSTEMS

ABC—See American Blower Co.

AMERICAN Blower Co., Detroit, Mich. "ABC."

BUFFALO Forge Co., Buffalo, N. Y.

KNICKERBOCKER Co., Jackson, Mich. "Morse-Rarefied."

MORSE-RAREFIED—See Knickerbocker Co.

PANGBORN Corp., Hagerstown, Md.

COMPOUNDS

BRAZING COMPOUNDS

A. & J. Mfg. Co., Chicago, Ill. "Braziron."

ACME—See Universal Fluxine Co.

BANNER—See Cortland Specialty Co.

BRAZIRON—See A. & J. Mfg. Co.

CAST Iron Brazing & Mfg. Co., Manchester, N. H.

CORTLAND Specialty Co., Cortland, N. Y. "Banner."

DIXON Crucible Co., Joseph, Jersey City, N. J. (See page 195.)

FLUXINE—See Krembs & Co.

FRY, Keyser, Reading, Pa.

HALL-THOMPSON Co., Hartford, Conn. "Wonder Worker."

KREMBS & Co., Chicago, Ill. "Fluxine."

LAFFITTE—See Phillips-Laffitte Co.

NATIONAL Cement & Rubber Co., Toledo, O

PHILLIPS-LAFFITTE Co., Philadelphia, Pa. (Importers.) "Laffitte," "Unifonte."

SCHNEIDER, Emil, Newark, N. J.

STANDARD Brazing Co., Boston, Mass. "Tichon."

STANDARD Mfg. Co., Chicago, Ill. "Superior."

SUPERIOR—See Standard Mfg. Co.

TICHON—See Standard Brazing Co.

UNIFONTE—See Phillips-Laffitte Co.

UNIVERSAL Fluxine Co., Urbana, O. "Acme."

WESTINGHOUSE Electric & Mfg. Co., Pittsburg, Pa.

WONDER WORKER—See Hall-Thompson Co.

BUFFING AND POLISHING COMPOUNDS

BENNETT-O'CONNELL Co., Chicago, Ill. "Mascot," "Excel-All."

DIXON, Wm., New York, N. Y.

EXCEL-ALL—See Bennett-O'Connell Co.

LYMAN Co., John R., Springfield, Mass.

MASCOT—See Bennett-O'Connell Co.

MATCHLESS Metal Polish Co., New York, N. Y. "White-Diamond."

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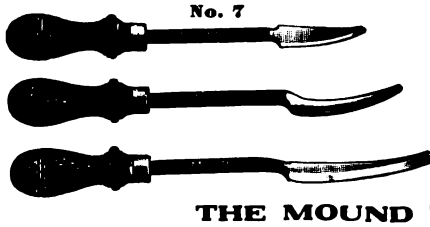

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COMPOUNDS (Continued)

BUFFING AND POLISHING COMPOUNDS (Continued)

STEVENS, Frederic B., Detroit, Mich. "White Rose," "White Columbia." (See pages 527 and 528.)

WHITE COLUMBIA—See Stevens, Frederic B

WHITE-DIAMOND—See Matchless Metal Polish Co.

WHITE ROSE—See Stevens, Frederic B.

WILLIAMSVILLE Buff Mfg. Co., Danielson, Conn.

CASE HARDENING COMPOUNDS

ACHILLES—See Houghton & Co.

BLACK DIAMOND—See Rogers & Hubbard Co.

BLAICH, Alfred O., 1956 Clybourn Ave., Chicago, Ill. (See page 469.)

BOHNITE—See Case Hardening Service Co.

CARBO—See Rodman Chemical Co.

CASE Hardening Service Co., Cleveland, O. "Bohnite," "Unicase."

GIBSON & Co., W. J., Chicago, Ill.

HAFLEIGH & Co., Philadelphia, Pa.

HOUGHTON & Co., E. F., Philadelphia, Pa. "Achilles," "Pearlite."

IDEAL Case-Hardening Compound Co., New York, N. Y.

KEYSTONE—See Rodman Chemical Co.

MORRIS & Co., Chicago, Ill.

MOSSO, C. A., Chicago, Ill.

PARK Chemical Co., Detroit, Mich. "Woodsides."

PEARLITE—See Houghton & Co.

PETTINOS Bros., Bethlehem, Pa.

PORTLAND—See Rogers & Hubbard Co.

RODMAN Chemical Co., East Pittsburg, Pa. "Carbo." "Keystone."

ROGERS & Hubbard Co., Middletown, Conn. "Black Diamond," "Standard," "Portland."

STANDARD—See Rogers & Hubbard Co.

STERLINGWORTH Charcoal Co., Cambridge, Mass.

STEVENS, Frederic B., Detroit, Mich. (See pages 527 and 528.)

UNICASE—See Case Hardening Service Co.

V. D.—See Van Doren Mfg. Co.

VAN Doren Mfg. Co., Chicago Heights, Ill. "V. D."

VINCENT Steel Process Co., Detroit, Mich.

WOODSIDES—See Park Chemical Co.

CORE COMPOUNDS

EBONY—See Hill & Griffith Co.

GLUTRIN—See Robeson Process Co.

HILL & Griffith Co., Cincinnati, O. "Ebony," "Linoline."

HOLLAND Linseed Oil Co., Chicago, Ill.

KING KORE KOMPOUND—See Stevens, Frederic B.

LINOLINE—See Hill & Griffith Co.

McCORMICK Co., J. S., Pittsburg, Pa.

MILLS Mfg. Co., H. E., Syracuse, N. Y.

OBERMAYER Co., S., Cincinnati, O.

PAXSON Co., J. W., 1019 N. Delaware Ave., Philadelphia, Pa. (See page 523.)

ROBESON Process Co., Au Sable Forks, N. Y. "Glutrin."

STEVENS, Frederic B., Detroit, Mich. "King Kore Kompound." (See pages 527 and 528.)

VAN TILBURY Oil Co., Minneapolis, Minn.

POLISHING COMPOUNDS

(See Compounds, Buffing and Polishing)

WELDING COMPOUNDS

BANNER—See Cortland Specialty Co.

CORTLAND Specialty Co., Cortland, N. Y. "Banner," "Excelsior."

CORTLAND Welding Compound Co., Cortland, N. Y.

DINGEE, Mont. H., Lynchburg, Va. "Sparger's."

EXCELSIOR—See Cortland Specialty Co.

KREMBS & Co., Chicago, Ill. "Weldine."

SPARGER'S—See Dingee, Mont. H.

UNIVERSAL Fluxine Co., Urbana, O.

WELDINE—See Krembs & Co.

COUNTERBORES

CLEVELAND Twist Drill Co., Cleveland, O.

CLOUGH, R. M., Tolland, Conn.

ECLIPSE Interchangeable Counterbore Co., Detroit, Mich.

KENDRICK & Davis Co., Lebanon, N. H.

MORSE Twist Drill & Machine Co., New Bedford, Mass.

NATIONAL Twist Drill & Tool Co., Detroit, Mich.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

WELLS & Son Co., F. E., Greenfield, Mass.

COUNTERSINKS

BILLINGS & Spencer Co., Hartford, Conn.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BRUBAKER & Bros., W. L., Millersburg, Pa

CELFOR Tool Co., Buchanan, Mich.

CINCINNATI Tool Co., Norwood, O. "Hargrave."

CLEVELAND Twist Drill Co., Cleveland, O.

DETROIT Twist Drill Co., 657-69 Fort St., Detroit, Mich. (See page 489.)

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COUNTERSINKS (Continued)

DEUSE, J. S., Chester, Conn.

DIAMOND—See Whitman & Barnes Mfg. Co.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Lightning," "Little Giant."

HARGRAVE—See Cincinnati Tool Co.

JOHNSON, Wm., Newark, N. J.

KENDRICK & Davis Co., Lebanon, N. H.

KILBORN & Bishop Co., New Haven, Conn.

LIGHTNING—See Greenfield Tap & Die Co.

LITTLE GIANT—See Greenfield Tap & Die Co.

LOWENTRAUT Mfg. Co., P., Newark, N. J.

MAYHEW Co., H. H., Shelburne Falls, Mass.

MORSE Twist Drill & Machine Co., New Bedford, Mass.

NATIONAL Twist Drill & Tool Co., Detroit, Mich.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

SNELL Mfg. Co., Fishdale, Mass.

STANDARD Tool Co., Cleveland, O.

STARRETT Co., L. S., Athol, Mass.

SWAN Co., Jas., Seymour, Conn.

SYRACUSE Twist Drill Co., Syracuse, N. Y.

TUCK Mfg. Co., Brockton, Mass.

VAUGHAN & Bushnell Mfg. Co., Chicago, Ill.

WELLS & Son Co., F. E., Greenfield, Mass.

WHITMAN & Barnes Mfg. Co., Akron, O. "Diamond."

CRANES

PORTABLE CRANES, HOISTS AND CHAIN BLOCKS

ACME—See Moore Co.

BEACH Auto Turntable Co., T. C., St. Johns, Mich.

BOSTON & Lockport Block Co., Boston, Mass.

BURR Mfg. Co., Cleveland, O.

CAMERON Engineering Co., Washington, N. J.

CANTON Foundry & Mfg. Co., Canton, O. (See page 437.)

CHISHOLM-MOORE Mfg. Co., Cleveland, O. "Cyclone."

CYCLONE—See Chisholm-Moore Mfg. Co.

FORD Chain Block & Mfg. Co., Philadelphia, Pa. "Tribloc."

FRANKLIN Portable Crane & Hoist Co., Franklin, Pa.

HARRINGTON Son & Co., Edwin, Philadelphia, Pa. "Peerless."

IMPERIAL—See Ingersoll-Rand Co.

IMPERIAL—See Moore Co.

INGERSOLL-RAND Co., 11 Broadway, New York, N. Y. "Imperial." (See page 535.)

LAFAYETTE Engineering Co., Lafayette, Ind.

MILTON & Son, S. G., Franklin, Pa.

MOORE Co., Franklin, Winsted, Conn. "Acme," "Imperial."

NEW Jersey Foundry & Machine Co., New York, N. Y.

NILES-BEMENT-POND Co., New York, N. Y.

PEERLESS—See Harrington Son & Co.

ROUND & Son, D., Cleveland, O. "Simplex," "Weston."

SIMPLEX—See Round & Son.

SPEIDEL, J. G., Reading, Pa.

STONE, Frank Porter, Chicago, Ill.

TRIBLOC—See Ford Chain Block & Mfg. Co.

UNION Elevator & Machine Co., Chicago, Ill.

WESTON—See Round & Son.

WRIGHT Mfg. Co., Lisbon, O.

YALE & Towne Mfg. Co., New York, N. Y.

CRUCIBLES

METAL MELTING CRUCIBLES

BARTLEY Crucible Co., Jonathan, Trenton, N. J.

BAY State Crucible Co., Taunton, Mass.

BRIDGEPORT Crucible Co., Bridgeport, Conn.

DIXON Crucible Co., Joseph, Jersey City, N. J. (See page 195.)

GAUTIER & Co., J. H., Jersey City, N. J.

McCULLOUGH-DALZELL Crucible Co., Pittsburg, Pa.

ROSS-TACONY Crucible Co., Philadelphia, Pa.

SEIDEL, R. B., Philadelphia, Pa.

TAUNTON Crucible Co., Taunton, Mass.

CUPOLAS

FOUNDRY CUPOLAS

CALUMET Foundry Equipment Co., Harvey, Ill.

McCORMICK Co., J. S., Pittsburg, Pa.

McNEIL & Bro. Co., Jas., Pittsburg, Pa.

NEWTEN—See Northern Engineering Works.

NORTHERN Engineering Works, 2 Chene St., Detroit, Mich. "Newton."

PAXSON Co., J. W., 1019 N. Delaware Ave., Philadelphia, Pa. (See page 523.)

WHITING Foundry Equipment Co., Harvey, Ill.

CUTTERS

BAR CUTTERS

(See Cutters, Rod and Bar)

GASKET CUTTERS

(See Cutters, Washer and Gasket)

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CUTTERS (Continued)

MILLING CUTTERS

BARBER-COLMAN Co., Rockford, Ill.

BECKER Milling Machine Co., Hyde Park, Mass.

BROWN & Sharpe Mfg. Co., Providence, R. I.

CLEVELAND Twist Drill Co., Cleveland, O.

CLOUGH, R. M., Tolland, Conn.

DETROIT Twist Drill Co., 657-69 Fort St., Detroit, Mich.
(See page 489.)

HUTHER Bros. Saw Mfg. Co., Rochester, N. Y.

ILLINOIS Tool Works, Chicago, Ill.

INGERSOLL Milling Machine Co., Rockford, Ill.

LINCOLN-WILLIAMS Twist Drill Co., Taunton, Mass.

MORSE Twist Drill & Machine Co., New Bedford, Mass.

NATIONAL Tool Co., Cleveland, O.

NATIONAL Twist Drill & Tool Co., Detroit, Mich.

PRATT & Whitney Co., Hartford, Conn.
(See page 463.)

STANDARD Tool Co., Cleveland, O.

TABOR Mfg. Co., Philadelphia, Pa. "Taylor-Newbold."

TAYLOR-NEWBOLD—See Tabor Mfg. Co.

TINDEL-MORRIS Co., Eddystone, Pa.

UNION Twist Drill Co., Athol, Mass.

UNIVERSAL Boring Machine Co., Hudson, Mass.

WHITNEY Mfg. Co., Hartford, Conn.
(See page 115.)

PIPE CUTTERS

(Hand Power)

ARMSTRONG Mfg. Co., Bridgeport, Conn.

AYES & Co., Chicago, Ill. "Barnes," "Saunders."

BARNES—See Ayes & Co.

BARNES—See Collmer Bros.

BARNES Tool Co., New Haven, Conn.

COLLMER Bros., South Bend, Ind. "Barnes," "Saunders."

ERIE Tool Works, Erie, Pa.

HOLLANDS Mfg. Co., Erie, Pa.

MARK Mfg. Co., Chicago, Ill.

OSWEGO Tool Co., Oswego, N. Y.

REED Mfg. Co., Erie, Pa.

SAUNDERS—See Ayes & Co.

SAUNDERS—See Collmer Bros.

SAUNDERS Sons, D., Yonkers, N. Y.

TRIMO—See Trimont Mfg. Co.

TRIMONT Mfg. Co., Roxbury, Mass. "Trimo."
(See page 563.)

WELLS & Son Co., F. E., Greenfield, Mass.

ROD AND BAR CUTTERS

(Hand Power)

ARMSTRONG-BLUM Mfg. Co., Chicago, Ill "Marvel."

BELDEN Machine Co., New Haven, Conn.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

MARVEL—See Armstrong-Blum Mfg. Co.

MERWIN Mfg. Co., Erie, Pa. "Vulcan."

SCHATZ Mfg. Co., Poughkeepsie, N. Y.

VULCAN—See Merwin Mfg. Co.

WALLACE Supply Co., Chicago, Ill.

SPRUE CUTTERS

BARNETT Foundry Co., Oscar, Irvington N. J.

BLISS Co., E. W., Brooklyn, N. Y.

BRASS Founders Supply Co., Newark, N. J.

SHUSTER Co., F. B., New Haven, Conn.

STANDARD Machinery Co., Auburn, R. I.
(See page 443.)

STOLL Co., D. H., Buffalo, N. Y.

TOLEDO Machine & Tool Co., Toledo, O.

TURNER Machine Co., Philadelphia, Pa.

WASHER OR GASKET CUTTERS

BONNEY Vise & Tool Works, Allentown, Pa "Cooper."

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

CINCINNATI Tool Co., Norwood, O. "Hargrave."

COOPER—See Bonney Vise & Tool Works.

GOODELL-PRATT Co., Greenfield, Mass.

HARGRAVE—See Cincinnati Tool Co.

HOGGSON & Pettis Mfg. Co., New Haven, Conn.

JOHNSON, Wm., Newark, N. J.

KRAEUTER & Co., Newark, N. J.

LOWENTRAUT Mfg. Co., P., Newark, N. J.

MOUND Tool Co., Seventh & Hickory Sts., St. Louis, Mo.
(See page 475.)

ROSE, J. A., Hastings, Neb.

SHAWVER Co., Springfield, O.

SMITH, Otis A., Rockfall, Conn.

STORTZ & Son, John, Philadelphia, Pa.

WOOD FORMING CUTTERS

SHIMER & Sons, Samuel J., Milton, Pa.

DIES

SCREW CUTTING DIES

(See Taps and Dies)

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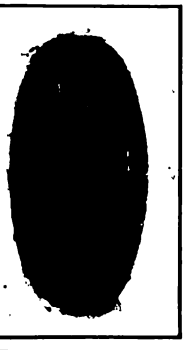

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DIVIDERS

DIVIDERS AND CALIPERS

(See Calipers and Dividers)

DOGS

LATHE DOGS

ARMSTRONG Bros. Tool Co., 304 N. Francisco Ave., Chicago, Ill. **(See page 541.)**

BESLY & Co., Charles H., Chicago, Ill.

BILLINGS & Spencer Co., Hartford, Conn.

BONNEY Vise & Tool Works, Allentown, Pa. "Indispensable."

COLLMER Bros., South Bend, Ind. "Le Count."

INDISPENSABLE—See Bonney Vise & Tool Works.

LE COUNT—See Collmer Bros.

LE COUNT, Wm. G., South Norwalk, Conn.

LUTZ-WEBSTER Engineering Co., Philadelphia, Pa.

MARK Mfg. Co., Chicago, Ill.

NATIONAL—See Oneida National Chuck Co.

O. K. Tool Holder Co., Shelton, Conn.

ONEIDA National Chuck Co., Oneida, N. Y. "National."

OSWEGO Tool Co., Oswego, N. Y.

PHOENIX Hardware Co., Buffalo, N. Y.

READY Tool Co., Bridgeport, Conn. "Red-E."

RED-E—See Ready Tool Co.

STRASBURGER Mfg. Co., Chicago, Ill.

UNION Caliper Co., Orange, Mass.

UNION Elevator & Machine Co., Chicago, Ill.

VULCAN—See Williams & Co.

WEST Steel Casting Co., Cleveland, O.

WILLIAMS & Co., J. H., Brooklyn, N. Y. "Vulcan."

DOWELS

PATTERN MAKERS DOWELS

BENSKIN Mfg. Co., Canton, O. "Perfect."

BUTLER, A. G., New York, N. Y.

CLEVELAND Galvanizing Works Co., Cleveland, O.

DIAMOND Clamp & Flask Co., Richmond, Ind.

EVERETT & Son, A., Auburn, N. Y.

KNIGHT & Son, H. W., Seneca Falls, N. Y.

MORSE, Frank W., Boston, Mass.

PAXSON Co., J. W., 1019 N. Delaware Ave., Philadelphia, Pa. **(See page 523.)**

PERFECT—See Benskin Mfg. Co.

SHANAFELT Mfg. Co., Canton, O.

TIMMIS & Clissold, Bound Brook, N. J.

WELLMAN Pattern-Supply Co., Cleveland, O.

WINKLEY Co., Detroit, Mich. **(See page 149.)**

DRESSERS

EMERY WHEEL DRESSERS

BALDWIN, Tuthill & Bolton, Grand Rapids, Mich.

BAY State Stamping Co., Worcester, Mass. "Bennett."

BENNETT—See Bay State Stamping Co.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BROWNE & Dowd Mfg. Co., Meriden, Conn.

CALDER, Geo. H., Lancaster, Pa.

CHALLENGE Machine Co., Philadelphia, Pa.

CHICAGO Screw Co., Homan Ave. & Fillmore St., Chicago, Ill. "Huntington." **(See pages 231 and 345.)**

CLIZBE Bros. Mfg. Co., Plymouth, Ind. "Crown."

COLLMER Bros., South Bend, Ind. "Huntington."

COLUMBUS Bolt Works, Columbus, O.

CRAFTS, Arthur A., Boston, Mass.

CROWN—See Clizbe Bros. Mfg. Co.

DESMOND-STEPHAN Mfg. Co., Urbana, O. "Diamo-Carbo," "Sherman," "Huntington."

DETROIT Screw Works, Detroit, Mich. "Huntington." **(See page 347.)**

DIAMO-CARBO—See Desmond-Stephan Mfg. Co.

DIAMOND Saw & Stamping Works, Buffalo, N. Y. "Sterling."

DIAMOND Tool Co., Chicago, Ill.

DIAMOND Tool & Die Co., Hartford, Conn.

ERIE Tool Works, Erie, Pa.

HUNTINGTON—See Chicago Screw Co.

HUNTINGTON—See Collmer Bros.

HUNTINGTON—See Desmond-Stephan Mfg. Co.

HUNTINGTON—See Detroit Screw Works.

HUNTINGTON—See Mark Mfg. Co.

MARK Mfg. Co., Chicago, Ill. "Huntington."

NORTH Wales Machine Co., North Wales, Pa.

OSGOOD, J. L., Buffalo, N. Y.

PENINSULA Emery Wheel Co., Detroit, Mich.

QUADRIGA Mfg. Co., Chicago, Ill. "Rearwin."

REARWIN—See Quadriga Mfg. Co.

REED Mfg. Co., Erie, Pa.

SHERMAN—See Desmond-Stephan Mfg. Co.

STANDARD Tool Co., Cleveland, O.

STERLING—See Diamond Saw & Stamping Works.

STERLING Grinding Wheel Co., Tiffin, O.

STRICKLAND, E. M., Detroit, Mich.

VINCENT Steel Process Co., Detroit, Mich.

WESTERN Tool & Mfg. Co., Springfield, O.

WRIGLEY Co., Thomas, Chicago, Ill.

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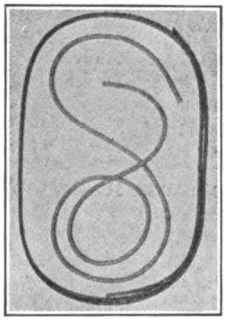

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DRILLS

BREAST DRILLS

FRAY Co., John S., Bridgeport, Conn.

GOODELL-PRATT Co., Greenfield, Mass.

LANCASTER Machine & Knife Works, Lancaster, N. Y. "McClellan."

McCLELLAN—See Lancaster Machine & Knife Works.

MALLEABLE Iron Fittings Co., Branford, Conn. "Mifco."
(See page 485.)

MIFCO—See Malleable Iron Fittings Co.

MILLERS Falls Co., New York, N. Y.

NORTH Bros. Mfg. Co., Philadelphia, Pa. "Yankee."

PECK, Stow & Wilcox Co., Southington, Conn.

TURNER & Deegan, Bristol, Conn.

YANKEE—See North Bros. Mfg. Co.

CENTERING DRILLS

CLEVELAND Twist Drill Co., Cleveland, O.

SLOCOMB Co., J. T., Providence, R. I.

PNEUMATIC DRILLS

(See Tools, Pneumatic)

ELECTRIC PORTABLE DRILLS, GRINDERS AND POLISHERS

AMERICAN Electric Tool Co., West Newton, Mass. "Carver."

CARVER—See American Electric Tool Co.

CHICAGO Pneumatic Tool Co., Chicago, Ill. "Duntley."

CINCINNATI Electrical Tool Co., Cincinnati, O. "Peerless."

CLARK, Jr., Electric Co., James, Louisville, Ky. "Willey."

COATES Clipper Mfg. Co., Worcester, Mass.

CRANE, H. G., Brookline, Mass.

DEER Co., A. J., Hornell, N. Y. "Royal."

DUMORE—See Wisconsin Electric Co.

DUNTLEY—See Chicago Pneumatic Tool Co.

GEM Mfg. Co., Pittsburg, Pa.

HISEY-WOLF Machine Co., Cincinnati, O.

IDEAL—See Smith Electric Tool Co.

PEERLESS—See Cincinnati Electrical Tool Co.

PEERLESS—See United Mfg. Co.

PLANK Flexible Shaft Machine Co., Grand Rapids, Mich.

RACINE Electric Co., Racine, Wis.

ROYAL—See Deer Co.

SMITH Electric Tool Co., Cincinnati, O. "Ideal."

STANDARD Electric Tool Co., Cincinnati, O.

STOW Flexible Shaft Co., Philadelphia, Pa.

STOW Mfg. Co., Binghamton, N. Y.

TEMCO Electric Motor Co., Leipsic, O.

UNITED Mfg. Co., 1015 Commerce Bldg., Kansas City, Mo. "Peerless."

UNITED States Electrical Tool Co., Cincinnati, O.
(See page 487.)

VAN DORN Electric Tool Co., Cleveland, O.

WILLEY—See Clark, Jr., Electric Co.

WISCONSIN Electric Co., Racine, Wis. "Dumore."

MULTIPLE SPINDLE DRILLING MACHINES

BAUSH Machine Tool Co., Springfield, Mass

FOOTE-BURT Co., Cleveland, O.

FOX Machine Co., Grand Rapids, Mich.

MOLINE Tool Co., Moline, Ill.

NATCO—See National Automatic Tool Co.

NATIONAL Automatic Tool Co., Richmond, Ind. "Natco."

PRATT & Whitney Co., Hartford, Conn.
(See page 463.)

SCALLAN & Co., W. E., Cincinnati, O.

POST DRILLING MACHINES

ADVANCE—See Silver Mfg. Co.

AMERICAN Foundry & Mfg. Co., St. Louis Mo.

BAUSH Machine Tool Co., Springfield, Mass.

BOYNTON & Plummer, Worcester, Mass.

BUFFALO Forge Co., Buffalo, N. Y.

CANEDY-OTTO Mfg. Co., Chicago Heights, Ill. "Western Chief."

CHAMPION Blower & Forge Co., Lancaster, Pa.

GREEN RIVER—See Greenfield Tap & Die Co.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Green River."

ILLINOIS Iron & Bolt Co., Carpentersville, Ill

LITTLE GIANT—See Noyes & Co.

NOYES & CO., B. B., Greenfield, Mass. "Little Giant."

SILVER Mfg. Co., Salem, O. "Advance."

WESTERN CHIEF—See Canedy-Otto Mfg. Co.

RADIAL DRILLING MACHINES

AMERICAN Tool Works Co., Cincinnati, O.

BAUSH Machine Tool Co., Springfield, Mass.

CINCINNATI-BICKFORD Tool Co., Cincinnati, O.

DRESES Machine Tool Co., Cincinnati, O.

FOSDICK Machine Tool Co., Cincinnati, O.

GANG CO., Wm. E., Cincinnati, O.

HILBERT Machine Co., Cincinnati, O.

MORRIS Machine Tool Co., John B., Cincinnati, O.

MUELLER Machine Tool Co., Cincinnati, O.

NILES-BEMENT-POND CO., New York, N. Y.

REED-PRENTICE Co., Worcester, Mass.

TAYLOR & Fenn Co., Hartford, Conn.

WESTERN Machine Tool Works, Holland, Mich.

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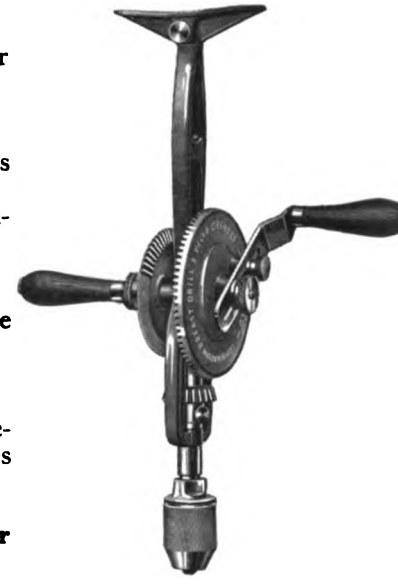
MIFCO Combination Breast Drill and Valve Grinder.

Price, $5.50



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Special 3-jaw chuck holds drills from No. 80 to ½-inch.
Cut gears and anti-friction thrust-bearing makes drilling easy.

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Produces a velvet finish on the roughest valve with little effort.
Requires no pressure.
Cannot injure valve or seat.
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Jaws case hardened.
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Contract Machining.

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DRILLS (Continued)

RATCHET DRILLS

ARMSTRONG Bros. Tool Co., 304 N. Francisco Ave., Chicago, Ill. **(See page 541.)**

ATHA Tool Co., Newark, N. J.

BILLINGS & Spencer Co., Hartford, Conn. "Packer."

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

DIAMOND—See Whitman & Barnes Mfg. Co.

GOODELL-PRATT Co., Greenfield, Mass.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Little Giant."

HUNTER Machine Co., Jas., North Adams, Mass.

KEYSTONE Mfg. Co., Buffalo, N. Y. "Monarch," "Weston."

LITTLE GIANT—See Greenfield Tap & Die Co.

LOWELL Wrench Co., Worcester, Mass.

MILLERS Falls Co., New York, N. Y.

MONARCH—See Keystone Mfg. Co.

OHLEN & Sons Saw Mfg. Co., James, Columbus, O.

OSWEGO Tool Co., Oswego, N. Y. "Packer."

PACKER—See Billings & Spencer Co.

PACKER—See Oswego Tool Co.

PARKER Co., Charles, Meriden, Conn.

PECK, Stow & Wilcox Co., Southington, Conn.

PRATT & Whitney Co., Hartford, Conn. "Renshaw." **(See page 463.)**

RENSHAW—See Pratt & Whitney Co.

WESTON—See Keystone Mfg. Co.

WHITMAN & Barnes Mfg. Co., Akron, O. "Diamond."

SENSITIVE DRILLING MACHINES

AVEY—See Cincinnati Pulley Machinery Co.

BURKE Machine Tool Co., Conneaut, O.

CINCINNATI Pulley Machinery Co., Cincinnati, O. "Avey."

CONOVER-OVERKAMP Machine & Tool Co., Dayton, O.

FOX Machine Co., Grand Rapids, Mich.

HAMILTON Machine Tool Co., Hamilton, O.

HENRY & Wright Mfg. Co., Hartford, Conn.

HOYSRADT & Case, Kingston, N. Y.

KNIGHT Machinery Co., W. B., St. Louis, Mo.

LANGELIER Mfg. Co., Providence, R. I.

LELAND-GIFFORD Co., Worcester, Mass.

NORTH Wales Machine Co., North Wales, Pa.

PRATT & Whitney Co., Hartford, Conn. **(See page 463.)**

REED Co., Francis, Worcester, Mass.

REED-PRENTICE Co., Worcester, Mass.

ROCKFORD Lathe & Drill Co., Rockford, Ill.

ROCKWELL—See Ryerson & Son.

RYERSON & Son, Joseph T., Chicago, Ill. "Rockwell."

SLOAN & Chace Mfg. Co., Newark, N. J.

STAPF & Co., John B., Dunkirk, N. Y.

TAYLOR & Fenn Co., Hartford, Conn.

VILLINGER Mfg. Co., Williamsport, Pa. "Williamsport."

WASHBURN Shops, Worcester, Mass.

WILLIAMSPORT—See Villinger Mfg. Co.

TURRET DRILLING MACHINES

NATIONAL Separator & Machine Co., Boston, Mass.

QUINT, A. D., Hartford, Conn.

TURNER Machine Co., Danbury, Conn.

TWIST DRILLS

CELFOR Tool Co., Buchanan, Mich.

CLEVELAND Twist Drill Co., Cleveland, O. "Paragon."

DETROIT Twist Drill Co., 657-69 Fort St., Detroit, Mich. **(See page 489.)**

DIAMOND—See Whitman & Barnes Mfg. Co.

LINCOLN-WILLIAMS Twist Drill Co., Taunton, Mass.

MORSE Twist Drill & Machine Co., New Bedford, Mass.

NATIONAL Twist Drill & Tool Co., Detroit, Mich.

NEW Process Twist Drill Co., Taunton, Mass.

NORKA—See Whitman & Barnes Mfg. Co.

PARAGON—See Cleveland Twist Drill Co.

PRATT & Whitney Co., Hartford, Conn. **(See page 463.)**

RICH Tool Co., Chicago, Ill.

STANDARD Tool Co., Cleveland, O.

SYRACUSE Twist Drill Co., Syracuse, N. Y.

UNION Twist Drill Co., Athol, Mass.

WHITMAN & Barnes Mfg. Co., Akron, O. "Norka," "Diamond."

UPRIGHT DRILLING MACHINES

AURORA Tool Works, Aurora, Ind.

BAKER Bros., Toledo, O.

BARNES Co., W. F. & John, Rockford, Ill.

BARNES Drill Co., Rockford, Ill.

BARR, H. G., Worcester, Mass.

CINCINNATI-BICKFORD Tool Co., Cincinnati, O.

COLBURN Machine Tool Co., Franklin, Pa.

DAVIS Machine Co., W. P., Rochester, N. Y.

FRONTIER Iron Works, Buffalo, N. Y.

HAMILTON Machine Tool Co., Hamilton, O.

HILBERT Machine Co., Cincinnati, O.

HOEFER Mfg. Co., Freeport, Ill.

KERN Machine Tool Co., Hamilton, O.

KNIGHT Machinery Co., W. B., St. Louis, Mo.

KOKOMO—See Superior Machine Tool Co.

NILES-BEMENT-POND Co., New York, N. Y.

REED-PRENTICE Co., Worcester, Mass.

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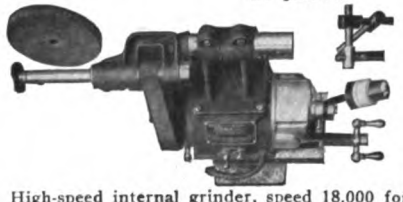
U. S. Electrical TOOLS

¼" drill, weight 9 pounds.

⅜" drill, weight 14 pounds

½" drill in steel, weight 24 pounds.

Made in three sizes, one-horse, two and three-horse.



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O grinder, for grinding castings.

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DRILLS (Continued)

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ROCKFORD Lathe & Drill Co., Rockford, Ill.

ROCKFORD Machine Tool Co., Rockford, Ill.

SIBLEY Machine Tool Co., South Bend, Ind.

SNYDER & Son, J. E., Worcester, Mass.

SUPERIOR Machine Tool Co., Kokomo, Ind. "Kokomo."

TAYLOR & Fenn Co., Hartford, Conn.

TSCHUDI-McBARRON Machine Co., Dayton, O.

DRIVERS

SCREW DRIVERS

AUTO Forge Sales Co., Columbus, O.

AUTODRIVER—See Bridgeport Hardware Mfg. Corp.

BILLINGS & Spencer Co., Hartford, Conn.

BISMARCH—See Bridgeport Hardware Mfg. Corp.

BLACKSTONE—See Bridgeport Hardware Mfg. Corp.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J. "New Century," "O. K.," "Ideal," "Peerless."

BRIDGEPORT Hardware Mfg. Corp., Bridgeport, Conn. "Autodriver," "Gripshank," "Perfecto," "Blackstone," "Challenge," "Warwick," "Bismarch," "Hercules," "Lead-All," "Matchless."

BROWN & Co., R. H., New Haven, Conn. "Clark's."

BUFFAM Tool Co., Louisiana, Mo.

CASSADY-FAIRBANK Mfg. Co., Chicago, Ill.

CHALLENGE—See Bridgeport Hardware Mfg. Corp.

CHAMPION—See Union Hardware Co.

CHAPIN-STEPHENS Co., Pine Meadow, Conn.

CINCINNATI Tool Co., Norwood, O. "Hargrave."

CLARK'S—See Brown & Co.

CRONK & Carrier Mfg. Co., Elmira, N. Y. "Elmira," "Star."

DICKE Tool Co., Downers Grove, Ill.

DIKEMAN Mfg. Co., Norwalk, Conn.

DISSTON Sons, Henry, Philadelphia, Pa.

ELMIRA—See Cronk & Carrier Mfg. Co.

ERIE Specialty Co., Erie, Pa. "Walker."

ERIE Stamping & Mfg. Co., Erie, Pa. "Esco."

ESCO—See Erie Stamping & Mfg. Co.

GAY, Geo. E., Augusta, Me.

GIANT—See Tuck Mfg. Co.

GOODELL-PRATT Co., Greenfield, Mass.

GRIPSHANK—See Bridgeport Hardware Mfg. Corp.

HARGRAVE—See Cincinnati Tool Co.

HERBRAND Co., Fremont, O.

HERCULES—See Tuck Mfg. Co.

HERCULES—See Bridgeport Hardware Mfg Corp.

HURWOOD—See Stanley Rule & Level Co.

IDEAL—See Braunsdorf-Mueller Co.

IRVINGTON Mfg. Co., Irvington, N. J.

IVES Mfg. Co., W. A., Wallingford, Conn. "Mephisto."

JOHNSON, Wm., Newark, N. J.

LEAD-ALL—See Bridgeport Hardware Mfg Corp.

LIPSCOMB—See Ellis Co.

MARBLE Arms & Mfg. Co., Gladstone, Mich.

MATCHLESS—See Bridgeport Hardware Mfg. Corp.

MAYHEW Co., H. H., Shelburne Falls, Mass. "Monarch," "Peerless."

MEPHISTO—See Ives Mfg. Co.

MONARCH—See Mayhew Co.

MOUND Tool Co., Seventh & Hickory Sts., St. Louis, Mo. (See page 475.)

NEVER BREAK—See S. & I. Co.

NEW CENTURY—See Braunsdorf-Mueller Co.

NORTH Bros. Mfg. Co., Philadelphia, Pa. "Yankee."

O. K.—See Braunsdorf-Mueller Co.

OHIO Tool Co., Charleston, W. Va.

PEERLESS—See Braunsdorf-Mueller Co.

PEERLESS—See Mayhew Co.

PERFECT HANDLE—See Smith & Co.

PERFECTO—See Bridgeport Hardware Mfg. Corp.

RELIABLE—See S. & I. Co.

RIVAL—See S. & I. Co.

S. & I. Co., Springfield, Mass. "Never Break," "Reliable," "Rival."

SMITH & Co., H. D., Plantsville, Conn. "Perfect Handle."

SNELL Mfg. Co., Fishdale, Mass.

STANLEY Rule & Level Co., New Britain, Conn. "Hurwood."

STAR—See Cronk & Carrier Mfg. Co.

STARRETT Co., L. S., Athol, Mass.

STORTZ & Son, John, Philadelphia, Pa.

SWAN Co., Jas., Seymour, Conn.

SYRACUSE Twist Drill Co., Syracuse, N. Y.

TUCK Mfg. Co., Brockton, Mass. "Hercules," "Giant."

TURNER & Deegan, Bristol, Conn.

UNION Hardware Co., Torrington, Conn. "Champion," "Valley."

VALLEY—See Union Hardware Co.

VLCHEK Tool Co., Cleveland, O.

WALKER—See Erie Specialty Co.

WARWICK—See Bridgeport Hardware Mfg. Corp.

WRIGHT Wrench & Forging Co., Canton, O.

YANKEE—See North Bros. Mfg. Co.

DRYERS

SAND DRYERS

PANGBORN Corp., Hagerstown, Md.

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REAMERS, CUTTERS, SPECIAL TOOLS, ETC.

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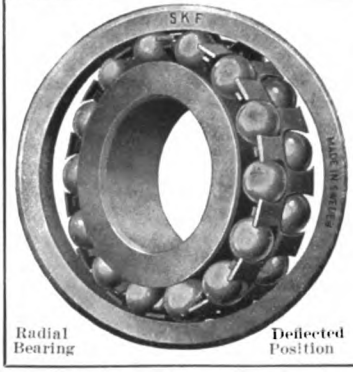
657-669 FORT STREET **DETROIT, MICH.**



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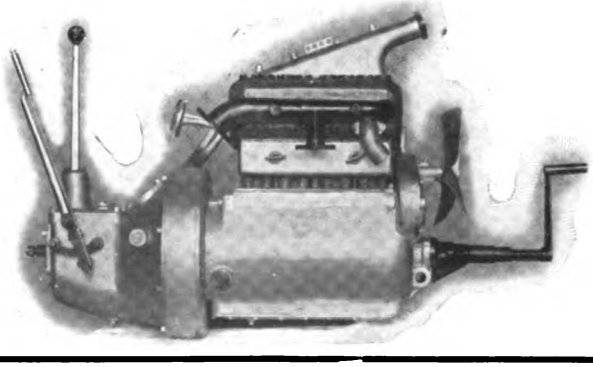

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KIECKHEFER Elevator Co., A., Milwaukee, Wis.

McLAUTHLIN Co., Geo. T., Boston, Mass.

OTIS Elevator Co., New York, N. Y.

REEDY Co., H. J., Cincinnati, O.

REEDY Elevator Co., Hoboken, N. J.

REEDY Elevator Mfg. Co., J. W., Chicago, Ill.

SEDGWICK Machine Works, New York, N. Y.

SIDNEY Elevator Mfg. Co., Sidney, O.

STORM Mfg. Co., Newark, N. J.

UNION Elevator & Machine Co., Chicago, Ill.

WARNER Elevator Mfg. Co., Cincinnati, O.

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AJAX Mfg. Co., Pittsburg (N. S.), Pa.

FORG, Peter, Somerville, Mass.

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ACCURATE—See National Metal Stamping & Mfg. Co.

ACME—See Rex-Harris Fire Appliance Co. of N. Y.

BADGER Chemical Mfg. Co., Milwaukee, Wis. "Mitchell," "Copper King," "Wisconsin."

BENTON—See Chemi Co.

BADGER & Sons Co., E. B., Boston, Mass.

BOYD & Bro., James, Philadelphia, Pa. "Keystone," "Paragon," "Marvello."

CHEMI Co., Richmond, Va. "Benton," "Jupiter."

CHILDS Co., O. J., Utica, N. Y. "Utica."

CHOKE-FIRE—See National Metal Stamping & Mfg. Co.

COPPER KING—See Badger Chemical Mfg. Co.

ECLIPSE—See Haverhill Fire Appliance Co.

EMMONS Specialty Co., Detroit, Mich. "Esco."

ESCO—See Emmons Specialty Co.

EVER Ready Mfg. Co., Buffalo, N. Y.

FIRE-FLY—See Northwestern Chemical Co.

FYRO Extinguisher Co., Syracuse, N. Y.

HAVERHILL Fire Appliance Co., Haverhill, Mass. "Eclipse."

HAYWARD & Co., S. F., New York, N. Y.

HOME Chemical Co., Rochester, N. Y.
J-M FYRO—See Johns-Manville Co.

J-M SUCCESS—See Johns-Manville Co.

JOHNS-MANVILLE Co., H. W., New York, N. Y. "Manville," "J-M Success," "J-M Fyro."

JOLIET—See Wilcox Co.

JUPITER—See Chemi Co.

KAHNWEILER'S Sons, David, New York, N. Y. "Simplex."

KEYSTONE—See Boyd & Bro.

LA MAY Mfg. Co., Rochester, N. Y.

LAZARUS Mfg. Co., 746 Euclid Ave., Cleveland, O.

LIBERTY Fire Extinguisher Co., Chicago, Ill.

LIQUID Carbonic Co., Chicago, Ill.

MANVILLE—See Johns-Manville Co.

MARTEN—See National Metal Stamping & Mfg. Co.

MARVELLO—See Boyd & Bro.

MINIMAX Co., New York, N. Y.

MITCHELL—See Badger Chemical Mfg. Co.

NATIONAL Metal Stamping & Mfg. Co., Newark, N. J. "Accurate," "Marten," "Peerless," "Choke-Fire," "Newark."

NEVERMYSS Fire Extinguisher Co., Middletown, N. Y.

NEWARK—See National Metal Stamping & Mfg. Co.

NORTHWESTERN Chemical Co., Marietta, O. "Fire-Fly."
(See page 131.)

PARAGON—See Boyd & Bro.

PEERLESS—See National Metal Stamping & Mfg. Co.

PROSPECT Mfg. Co., Prospect, O.

PYRENE Mfg. Co., 1358 Broadway, New York, N. Y.
(See page 163.)

REGINA—See Rex-Harris Fire Appliance Co. of N. Y.

REX-HARRIS Fire Appliance Co. of N. Y., New York, N. Y. "Regina," "Acme."

SIMPLEX—See Kainweiler's Sons.

STEMPEL Fire Extinguisher Co., St. Louis, Mo.

U. S.—See United Mfg. Co.

UNITED Mfg. Co., Toledo, O. "U. S."

UTICA—See Childs Co.

WILCOX Co., Chas. C., Enid, Okla. "Joliet."

WISCONSIN—See Badger Chemical Mfg. Co

EXTRACTORS

BROKEN TAP EXTRACTORS

WALTON Co., Hartford, Conn.

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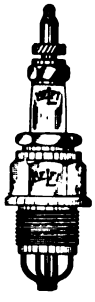

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FACINGS

FOUNDRY FACINGS AND PARTINGS

BROOKLYN Facing Mills, Brooklyn, N. Y.

CENTRAL Foundry Supply Co., Columbus, O.

DIXON Crucible Co., Joseph, Jersey City, N. J.
(See page 195.)

DOGGETT, Stanley, New York, N. Y.

EASTERN Facing Mills, Williamsport, Pa.

FOUNDRY Specialty Co., Cincinnati, O. "Partine."

HILL & Griffith Co., Cincinnati, O.

KELLY & Co., T. P., Hamilton, O

McCORMICK Co., J. S., Pittsburg, Pa.

PARTINE—See Foundry Specialty Co.

PAXSON Co., J. W., 1019 N. Delaware Ave., Philadelphia, Pa.
(See page 523.)

PETTINOS Bros., Bethlehem, Pa.

SPRINGFIELD Facing Co., Springfield, Mass.

STEVENS, Frederic B., Detroit, Mich.
(See pages 527 and 528.)

UNITED STATES Graphite Co., Saginaw, Mich.

FASTENERS

BELT FASTENERS

BUFFALO Specialty Co., Buffalo, N. Y.

BLAKES—See Greene, Tweed & Co.

CRESCENT Belt Fastener Co., New York, N. Y.

GREENE, Tweed & Co., New York, N. Y. "Blakes," "Morans."

JENCKES Mfg. Co., E., Worcester, Mass.

MORANS—See Greene, Tweed & Co.

QUADRIGA Mfg. Co., Chicago, Ill.

SMITH & Co., F. P., Sharon Hill, Pa. "Smithicks."

SMITHICKS—See Smith & Co.

FILES

FILES AND RASPS

AKRON File Co., Akron, O.

AMERICAN—See Nicholson File Co.

AMERICAN Swiss File & Tool Co., New York, N. Y.

ARCADE—See Nicholson File Co.

BARNETT Co., C. & H., Philadelphia, Pa. "Black Diamond."

BETTER-CUT—See Racine File Co.

BLACK DIAMOND—See Barnett Co.

CHATTERTON File Works, Providence, R. I.

CHELSEA File Works, Norwich, Conn.

COLONIAL File Co., Neponset, Mass. "Puritan."

DELTA File Works, Philadelphia, Pa.

DISSTON & Sons, H., Philadelphia, Pa.

EAGLE—See Nicholson File Co.

GEM City File Works Co., Quincy, Ill.

GOLD MEDAL—See Liveright Bros.

GRAVES File Co., Newark, N. J.

GREAT WESTERN—See Nicholson File Co.

GROBET—See Montgomery & Co.

HAYES File Co., Detroit, Mich.

HELLER Bros. Co., Newark, N. J.

J. B. SMITH—See Nicholson File Co.

JOHNSON & Bro., Newark, N. J. "Reliance."

KEARNEY & FOOT—See Nicholson File Co

LIVERIGHT Bros., Philadelphia, Pa. "Gold Medal."

McCAFFREY File Co., Philadelphia, Pa.

McCLELLAN—See Nicholson File Co.

MADDEN & Morrison File Co., Middletown, N. Y.

MONTGOMERY & Co., 105-07 Fulton St., New York, N. Y. (Importers.) "Grobet."
(See page 501.)

MURCOTT & Campbell, Brooklyn, N. Y.

NICHOLSON File Co., Providence, R. I. "American," "Arcade," "Eagle," "XF," "McClellan," "Kearney & Foot," "J. B. Smith," "Great Western."
(See page 493.)

PURITAN—See Colonial File Co.

RACINE File Co., Racine, Wis. "Better-cut."

RELIANCE—See Johnson & Bro.

REX File & Saw Co., Newcomerstown, O.

REYNOLDS Bros., Columbus, O.

SIMONDS Mfg. Co., Fitchburg, Mass.

STANDARD Roller Bearing Co., Philadelphia, Pa. "Vixen."

TROJAN—See Troy File Works.

TROY File Works, Troy, N. Y. "Trojan."

VIXEN—See Standard Roller Bearing Co.

WESTPHAL File Co., Milwaukee, Wis.

XF—See Nicholson File Co.

FILLETS

WOOD AND LEATHER FILLETS

BENSKIN Mfg. Co., Canton, O. "Perfect."

BUTLER, A. G., New York, N. Y.

CLEVELAND Galvanizing Works Co., Cleveland, O.

EVERETT & Son, A., Auburn, N. Y.

KNIGHT & Son, H. W., Seneca Falls, N. Y.

PAGE Belting Co., Concord, N. H.

PERFECT—See Benskin Mfg. Co.

SHANAFELT Mfg. Co., Canton, O.

TIMMIS & Clissold, Bound Brook, N. J.

WELLMAN Pattern-Supply Co., Cleveland, O.

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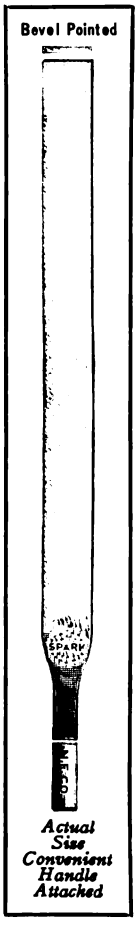

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FLASKS

FOUNDRY FLASKS

ADAMS Co., Dubuque, Ia.

BALDWIN, Tuthill & Bolton, Grand Rapids, Mich.

BARNETT Foundry Co., Oscar, Irvington, N. J.

BRASS Foundries Supply Co., Newark, N. J.

BUCH'S Sons Co., A., Elizabethtown, Pa.

DIAMOND Clamp & Flask Co., Richmond, Ind.

EUREKA—See Smith & Caffrey Co.

OBERMAYER Co., S., Cincinnati, O.

PAXSON Co., J. W., 1019 N. Delaware Ave., Philadelphia, Pa. **(See page 523.)**

SMITH & Caffrey Co., Syracuse, N. Y. "Eureka."

STERLING Wheelbarrow Co., Milwaukee, Wis.

FLUX

BRAZING FLUX

(See Compounds, Brazing)

SOLDERING FLUX

ALLEN Co., L. B., Chicago, Ill. "Sun," "Sampson."

ALUMALUX Co., Sidney, O. "Rajah."

BARCY-NICHOLSON Co., Detroit, Mich.

BENSON Co., Alex. R., Hudson, N. Y. "Yagers."

BLAKE Signal & Mfg. Co., Boston, Mass.

BRUNNER Chemical Works, Cincinnati, O. "Queen."

BURNLEY Battery & Mfg. Co., North East, Pa.

CALLAHAN & Co., Geo., New York, N. Y.

CRESCENT—See McGill Mfg. Co.

DIELECTRIC Mfg. Co., St. Louis, Mo.

DUNTON Co., M. W., Providence, R. I. "Nokorode."

ELLIOTT Chemical Works, Newton, Mass.

EUREKA—See Grasselli Chemical Co.

GRASSELLI Chemical Co., New York, N. Y. "Standard," "Eureka."

HESS & Son, Philadelphia, Pa. "Tinol."

ILLINOIS Smelting & Refining Co., Chicago, Ill.

INCOMPARABLE—See Reade Mfg. Co.

KALBFLEISCH Co., Franklin H., Broadway & 16th St., New York, N. Y. **(See page 319.)**

KREMBS & Co., Chicago, Ill.

McGILL Mfg. Co., Valparaiso, Ind. "Crescent," "Star."

NOKORODE—See Dunton Co.

PEERLESS—See Solderall Co.

QUEEN—See Brunner Chemical Works.

RAJAH—See Alumalux Co.

READE Mfg. Co., Hoboken, N. J. "Incomparable," "Readina."

READINA—See Reade Mfg. Co.

RED LETTER—See Ruby Chemical Co.

RUBY Chemical Co., Columbus, O. "Red Letter."

SAMPSON—See Allen Co.

SCHNEIDER, Emil, Newark, N. J.

SOLDERALL Co., New York, N. Y. "Peerless."

STANDARD—See Grasselli Chemical Co.

STAR—See McGill Mfg. Co.

SUN—See Allen Co.

TINOL—See Hess & Son.

TRIAD Co., Belmar, N. J.

UNIVERSAL Fluxine Co., Urbana, O.

WESTINGHOUSE Electric & Mfg. Co, Pittsburg, Pa.

YAGERS—See Benson Co.

WELDING FLUX

(See Compounds, Welding)

FORGES

BLACKSMITHS FORGES

BILLINGS & Spencer Co., Hartford, Conn.

BOYNTON & Plummer, Worcester, Mass.

BUFFALO Forge Co., Buffalo, N. Y.

CANEDY-OTTO Mfg. Co., Chicago Heights, Ill. "Royal," "Western Chief," "Challenge," "Hero," "Leader."

CANTON Foundry & Mfg. Co., Canton, O. **(See page 437.)**

CHALLENGE—See Canedy-Otto Mfg. Co.

CHAMPION Blower & Forge Co., Lancaster, Pa.

HERO—See Canedy-Otto Mfg. Co.

LEADER—See Canedy-Otto Mfg. Co.

ROYAL—See Canedy-Otto Mfg. Co.

SILVER Mfg. Co., Salem, O.

STURTEVANT Co., B. F., Hyde Park, Mass.

WESTERN CHIEF—See Canedy-Otto Mfg Co.

FRAMES

HACK SAW FRAMES

(For Hack Saw Blades—See Blades, Hack Saw)

ATKINS & Co., E. C., Indianapolis, Ind. "Hoosier," "Indiana."

BRIDGEPORT Hardware Mfg. Corp., Bridgeport, Conn.

BUFFUM Tool Co., Louisiana, Mo.

CROWN—See Union Hardware Co.

DIAMOND Saw & Stamping Works, Buffalo, N. Y. "Sterling."

DIKEMAN Mfg. Co., Norwalk, Conn.

DISSTON & Sons, Henry, Philadelphia, Pa. "Eagle," "Keystone."

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FRAMES (Continued)

HACK SAW FRAMES (Continued)

EAGLE—See Disston & Sons.

EAGLE—See Union Hardware Co.

GOODELL-PRATT Co., Greenfield, Mass.

GRIFFIN Co., G. W., Franklin, N. H.

HOOSIER—See Atkins & Co.

INDIANA—See Atkins & Co.

IRVINGTON Mfg. Co., Irvington, N. J.

JENNINGS & Co., C. E., New York, N. Y.

KEYSTONE—See Disston & Sons.

MASSACHUSETTS Saw Works, Springfield, Mass. "Victor."

MILLERS Falls Co., New York, N. Y. "Star."

QUALITY Saw & Tool Works, Springfield, Mass.

S. & I. Co., Springfield, Mass.

SIMONDS Mfg. Co., Fitchburg, Mass.

STAR—See Millers Falls Co.

STARRETT Co., L. S., Athol, Mass.

STERLING—See Diamond Saw & Stamping Works.

THOMPSON & Son Co., Henry G., New Haven, Conn.

UNION Caliper Co., Orange, Mass.

UNION Hardware Co., Torrington, Conn. "Crown," "Eagle."

UNIVERSAL—See West Haven Mfg. Co.

UTILITY—See West Haven Mfg. Co.

VICTOR—See Massachusetts Saw Works.

WEST Haven Mfg. Co., New Haven, Conn. "Utility," "Universal."

FULLERS

FULLERS AND SWAGES

ATHA Tool Co., Newark, N. J.

BEALL Bros., Alton, Ill.

EVANSVILLE Tool Works, Evansville, Ind.

HELLER Bros. Co., Newark, N. J.

KLEIN-LOGAN Co., Pittsburg, Pa.

LITTLE GIANT—See Noyes & Co.

NOYES & Co., B. B., Greenfield, Mass. "Little Giant."

SWETT Iron Works, A. L., Medina, N. Y.

VAUGHAN & Bushnell Mfg. Co., Chicago, Ill.

FUNNELS

GASOLINE FUNNELS

ATLANTIC Stamping Co., Rochester, N. Y.

BEST, R. L., Bismarck, N. Dak.

CENTRAL Stamping Co., New York, N. Y. "Puritan."

DOVER Stamping & Mfg. Co., Cambridge, Mass. "Saval." (See page 139.)

ENTORP Filter Co., Amboy, Ill.

HOAGLIN Mfg. Co., F. L., Waupaca, Wis. "Nospill."

MASON Co., Geo. H., Boston, Mass.

NATIONAL Enameling & Stamping Co., New York, N. Y.

NO-SHAMMY Products Co., Cleveland, O.

NOSPILL—See Hoaglin Mfg. Co.

PURITAN—See Central Stamping Co.

PURITAN—See Sexton Can Co.

SAVAL—See Dover Stamping & Mfg. Co.

SEXTON Can Co., Boston, Mass. "Puritan."

VOGEL & Bros., Wm., Brooklyn, N. Y.

WALLMAN Mfg. Co., Milwaukee, Wis.

WILSON & Co., F. Cortez, Chicago, Ill.

FURNACES

ANNEALING AND CASE HARDENING FURNACES

AMERICAN Gas Furnace Co., 24 John St., New York, N. Y. (See page 155.)

BELLEVUE Furnace Co., Detroit, Mich.

BEST, W. N., New York, N. Y.

BROWN & Sharpe Mfg. Co., Providence, R. I.

BUCKEYE—See Macleod Co.

CHICAGO Flexible Shaft Co., Chicago, Ill. "Stewart."

FOUNDRY Equipment Co., Buffalo, N. Y.

GANTT—See Witteman Co.

GILBERT & Barker Mfg. Co., Springfield, Mass.

HOSKINS Mfg. Co., Detroit, Mich.

MACLEOD Co., Cincinnati, O. "Buckeye."

ROCKWELL Co., W. S., New York, N. Y.

SCOTT, C. U., Davenport, Ia.

STEWART—See Chicago Flexible Shaft Co.

TATE-JONES & Co., Pittsburg, Pa.

WESTMACOTT Gas Furnace Co., Providence, R. I.

WHITING Foundry Equipment Co., Harvey, Ill.

BABBITT MELTING FURNACES

AMERICAN Gas Furnace Co., 24 John St., New York, N. Y. (See page 155.)

CHICAGO Flexible Shaft Co., Chicago, Ill.

DAVIS Machine Co., W. P., Rochester, N. Y. "Vesuvius."

ROCKWELL Co., W. S., New York, N. Y.

VESUVIUS—See Davis Machine Co.

WESTMACOTT Gas Furnace Co., Providence, R. I.

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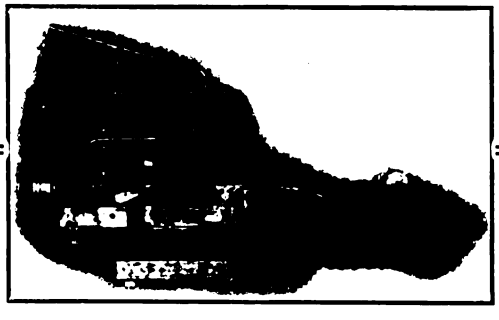

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BRASS AND COPPER MELTING FURNACES

BARNETT Foundry Co., Oscar, Irvington, N. J.

BEST, W. N., New York, N. Y.

BRASS Founders Supply Co., Newark, N. J.

CALUMET Foundry Equipment Co., Harvey, Ill.

CHICAGO Flexible Shaft Co., Chicago, Ill.

FISHER, Alfred, Chicago, Ill.

FOUNDRY Equipment Co., Buffalo, N. Y.

KROESCHELL Bros. Co., Chicago, Ill. "Kroeschell-Schwartz."

KROESCHELL-SCHWARTZ—See Kroeschell Bros. Co.

LITTLEFORD Bros., Cincinnati, O.

M. R. V.—See Wise, J. B.

MONARCH Engineering & Mfg. Co., Baltimore, Md. "Steele-Harvey."

PAXSON Co., J. W., 1019 N. Delaware Ave., Philadelphia, Pa. (See page 523.)

ROCKWELL Co., W. S., New York, N. Y.

STEELE-HARVEY—See Monarch Engineering & Mfg. Co.

STEVENS, Frederic B., Detroit, Mich. (See pages 527 and 528.)

WESTMACOTT Gas Furnace Co., Providence, R. I.

WHITING Foundry Equipment Co., Harvey, Ill.

WISE, J. B., Watertown, N. Y. "M. R. V."

GASOLINE FURNACES

(See Torches, Gasoline)

SOLDERING FURNACES

(See also Torches, Gasoline)

DETROIT Heating & Lighting Co., Detroit, Mich.

GAUGES

CENTRE GAUGES

ATHOL Machine Co., Athol, Mass.

BROWN & Sharpe Mfg. Co., Providence, R. I.

GOODELL-PRATT Co., Greenfield, Mass.

STARRETT Co., L. S., Athol, Mass.

WYKE, J., Wilmington, Mass.

DEPTH GAUGES

BILLINGS & Spencer Co., Hartford, Conn.

BROWN & Sharpe Mfg. Co., Providence, R. I.

GOODELL-PRATT Co., Greenfield, Mass.

STARRETT Co., L. S., Athol, Mass.

DRILL AND WIRE GAUGES

BLODGETT Mfg. Co., Rochester, N. Y.

BROWN & Sharpe Mfg. Co., Providence, R. I.

DETROIT Twist Drill Co., 657-69 Fort St., Detroit, Mich. (See page 489.)

MORSE Twist Drill & Machine Co., New Bedford, Mass.

PECK, Stow & Wilcox Co., Southington, Conn.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

STARRETT Co., L. S., Athol, Mass.

LIMIT GAUGES

BROWN & Sharpe Mfg. Co., Providence, R. I.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Little Giant."

LITTLE GIANT—See Greenfield Tap & Die Co.

NICHOLS, W. H., Waltham, Mass.

PRATT & Whitney Co., Hartford, Conn (See page 463.)

ROGERS Works, John M., Gloucester City, N. J.

SLOAN & Chace Mfg. Co., Newark, N. J.

PLUG AND RING GAUGES

AMES & Co., B. C., Waltham, Mass.

ATLAS Ball Co., Philadelphia, Pa.

BROWN & Sharpe Mfg. Co., Providence, R. I.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Little Giant."

GRONKVIST Drill Chuck Co., Jersey City, N. J. (Importers.) "Johansson."

JOHANSSON—See Gronkvist Drill Chuck Co.

LITTLE GIANT—See Greenfield Tap & Die Co.

MORSE Twist Drill & Machine Co., New Bedford, Mass.

NICHOLS, W. H., Waltham, Mass.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

ROGERS Works, John M., Gloucester City, N. J.

SLOAN & Chace Mfg. Co., Newark, N. J.

RING GAUGES

(See Gauges, Plug and Ring)

SCREW PITCH GAUGES

AMES & Co., B. C., Waltham, Mass.

ATHOL Machine Co., Athol, Mass.

BLODGETT Mfg. Co., Rochester, N. Y.

BROWN & Sharpe Mfg. Co., Providence, R. I.

GOODELL-PRATT Co., Greenfield, Mass.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Little Giant."

LITTLE GIANT—See Greenfield Tap & Die Co.

NICHOLS, W. H., Waltham, Mass.

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Here is a motor car top that positively has overcome more of the difficulties of top raising and lowering than any other device ever built.

The simplicity of this top which we term "ONE LADY TOP" is its most distinctive feature. So simple and so practical is it that any lady can raise it without the slightest difficulty. In fact, with one hand from the driver's seat, the top may be raised or lowered with ease.

THE DORL-WILEY ONE LADY TOP can be made in any style, including old and new line, at a much lower price than any other on the market and positively will not cut the cloth when being raised or lowered.

By all means investigate the DORL-WILEY ONE LADY TOP. The construction is the most unique and useful and the price the most attractive.

Dorl-Wiley Company
Offices:
517 Chamber of Commerce, Detroit, Mich.

Would You Believe It?

If told that your tires could be pumped full of air—**while running at full speed?**

You say, **"It can't be done"?**

But **it can be done—We have done it.**

The **"Automatic" Tire Inflator** will inflate your tires while at rest or in motion, and keep them at the desired pressure.

Do you realize what that means to you?

1. **No blow-outs.**
2. **Tires last twice as long.**
3. No stopping by roadside to mend a puncture—since you can pump air in faster than it escapes from an ordinary puncture.
4. Saves enough in time and tires to pay for itself in three months.

You can get it only from an agent of the

D. L. Davis Mfg. Co.
733 Marquette Bldg., Chicago, Ill.

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GAUGES (Continued)

SCREW PITCH GAUGES (Continued)

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

REED & Prince Mfg. Co., Worcester, Mass.

STARRETT Co., L. S., Athol, Mass.

UNION Caliper Co., Orange, Mass.

SURFACE GAUGES

BILLINGS & Spencer Co., Hartford, Conn.

BROWN & Sharpe Mfg. Co., Providence, R. I.

GOODELL-PRATT Co., Greenfield, Mass.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

REMINGTON Tool & Machine Co., Woburn, Mass.

STARRETT Co., L. S., Athol, Mass.

WYKE, J., Wilmington, Mass.

WIRE GAUGES

(See Gauges, Drill and Wire

GOGGLES

MECHANICS AND WELDERS GOGGLES

ADAMS, William C., 332 Boylston St., Boston, Mass. (See page 501.)

CHICAGO Eye Shield Co., Chicago, Ill.

GLOBE Optical Co., Boston, Mass.

GUARDIAN—See Sussfeld, Lorsch & Co.

SUSSFELD, Lorsch & Co., New York, N. Y. "Guardian."

GRINDERS

CHUCKING GRINDERS

BRYANT Chucking Grinder Co., Springfield, Vt.

CRANK PIN GRINDERS

LANDIS Tool Co., Waynesboro, Pa. (See page 503.)

NORTON Grinding Co., Worcester, Mass.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

TINDEL-ALBRECHT—See Tindel-Morris Co.

TINDEL-MORRIS Co., Eddystone, Pa. "Tindel-Albrecht."

CUTTER GRINDERS

(See Grinders, Reamer and Cutter)

CYLINDER GRINDERS

BROWN & Sharpe Mfg. Co., Providence, R. I.

HEALD Machine Co., Worcester, Mass.

DISC GRINDERS

BATH Grinder Co., Fitchburg, Mass.

BESLY & Co., Charles H., Chicago, Ill.

DIAMOND Machine Co., Providence, R. I.

GARDNER Machine Co., Beloit, Wis.

HOYSRADT & Case, Kingston, N. Y.

RANSOM Mfg. Co., Oshkosh, Wis.

ROWBOTTOM Machine Co., Waterbury, Conn.

TAYLOR & Fenn Co., Hartford, Conn.

VALLEY City Machine Works, Grand Rapids, Mich.

DRILL GRINDERS

HEALD Machine Co., Worcester, Mass.

MORSE Twist Drill & Machine Co., New Bedford, Mass.

NEW YANKEE—See Wilmarth & Morman Co.

SELLERS & Co., Wm., Philadelphia, Pa.

WASHBURN Shops, Worcester, Mass. "Worcester."

WILMARTH & Morman Co., Grand Rapids, Mich. "New Yankee."

WORCESTER—See Washburn Shops.

ELECTRIC PORTABLE GRINDERS

(See Drills, Electric Portable)

INTERNAL GRINDERS

BATH Grinder Co., Fitchburg, Mass.

BROWN & Sharpe Mfg. Co., Providence, R. I.

CONOVER-OVERKAMP Machine & Tool Co. Dayton, O.

HEALD Machine Co., Worcester, Mass.

LANDIS Tool Co., Waynesboro, Pa. (See page 503.)

MODERN Tool Co., Erie, Pa.

RIVETT Lathe & Grinder Co., Boston, Mass.

THOMPSON Grinder Co., Springfield, O.

VAN NORMAN Machine Tool Co., Springfield, Mass.

PISTON RING GRINDERS

ALERT—See Harding, S. B.

BAY State Grinder Co., Worcester, Mass.

GARRIGUS Machine Co., C. G., Bristol, Conn.

HARDING, S. B., Waukesha, Wis. "Alert."

HEALD Machine Co., Worcester, Mass.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

WALKER Grinder Co., Worcester, Mass.

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Protection Glasses for those who use Oxy-Acetylene Welding and Cutting Apparatus

WILLIAM C. ADAMS

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Welding Goggles and Protection Glasses

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SANDBO TWO-COMPRESSION STARTER

Guaranteed To Start Ford, Saxon or Maxwell 25.

Yes, Sir, the Sandbo Two-Compression Starter differs from all others—it turns the crank a complete revolution—over two compressions, past two ignition points—guaranteed to start even in the coldest winter weather. The Sandbo occupies a field by itself. Thousands have been sold and at the **New Price, $14**

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Our Splendid Proposition to Dealers

Get full details of how we co-operate with dealers—how our big advertising campaign in Saturday Evening Post and other national publications brings prospects which are turned over to our local dealers. Write at once to

SANDBO STARTER COMPANY, 21 Sandbo Bldg., Rock Island, Ill.

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GRINDERS (Continued)

PLAIN TOOL GRINDERS

ATHOL Machine Co., Athol, Mass.

BAIRD Machine Co., Bridgeport, Conn.

BATH Grinder Co., Fitchburg, Mass.

BLOUNT Co., J. G., Dept. A, Everett, Mass. (See page 505.)

BROWN & Sharpe Mfg. Co., Providence, R. I.

BUILDERS Iron Foundry, Providence, R. I.

CANTON Foundry & Mfg. Co., Canton, O. (See page 437.)

CHALLENGE Machine Co., Philadelphia, Pa.

CHICAGO Machine Tool Co., Chicago, Ill.

CLIZBE Bros. Mfg. Co., Plymouth, Ind. "Crown."

CROWN—See Clizbe Bros. Mfg. Co.

DIAMOND Machine Co., Providence, R. I.

FITCHBURG Grinder Co., Fitchburg, Mass.

LA SALLE Machine & Tool Co., La Salle, Ill.

LANDIS Tool Co., Waynesboro, Pa. (See page 503.)

LUTHER Grinder Mfg. Co., Milwaukee, Wis.

MODERN Tool Co., Erie, Pa.

NORTHAMPTON Emery Wheel Co., Leeds, Mass.

NORTON Grinding Co., Worcester, Mass.

OESTERLEIN Machine Co., Cincinnati, O.

PARTRIDGE, E. O., Chicago, Ill.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

RANSOM Mfg. Co., Oshkosh, Wis.

ROYERSFORD Foundry & Machine Co., Royersford, Pa.

ST. LOUIS Machine Tool Co., St. Louis, Mo. "Western."

STAPF & Co., John B., Dunkirk, N. Y.

TABOR Mfg. Co., Philadelphia, Pa. "Taylor."

TAYLOR—See Tabor Mfg. Co.

VALLEY City Machine Works, Grand Rapids, Mich.

WALKER Grinder Co., Worcester, Mass.

WEBSTER & Perks Tool Co., Springfield, O.

WESTERN—See St. Louis Machine Tool Co.

REAMER AND CUTTER GRINDERS

BATH Grinder Co., Fitchburg, Mass.

BROWN & Sharpe Mfg. Co., Providence, R. I.

CINCINNATI Milling Machine Co., Cincinnati, O.

CLOUGH, R. M., Tolland, Conn.

CONOVER-OVERKAMP Machine & Tool Co., Dayton, O.

GREENFIELD Machine Co., Greenfield, Mass.

INGERSOLL Milling Machine Co., Rockford, Ill.

LE BLOND Machine Tool Co., R. K., Cincinnati, O.

OESTERLEIN Machine Co., Cincinnati, O.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

THOMPSON Grinder Co., Springfield, O.

WALKER Grinder Co., Worcester, Mass.

WELLS & Son Co., F. E., Greenfield, Mass.

WILMARTH & Morman Co., Grand Rapids, Mich.

WOODS Engineering Co., Alliance, O.

SURFACE GRINDERS

BATH Grinder Co., Fitchburg, Mass.

BAY State Grinder Co., Worcester, Mass.

BROWN & Sharpe Mfg. Co., Providence, R. I.

CONOVER-OVERKAMP Machine & Tool Co., Dayton, O.

DIAMOND Machine Co., Providence, R. I.

GARRIGUS Machine Co., C. G., Bristol, Conn.

GARVIN Machine Co., New York, N. Y.

HEALD Machine Co., Worcester, Mass.

LA SALLE Machine & Tool Co., La Salle, Ill.

LANDIS Tool Co., Waynesboro, Pa. (See page 503.)

NORTHAMPTON Emery Wheel Co., Leeds, Mass.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

ROWBOTTOM Machine Co., Waterbury, Conn.

SPRINGFIELD Mfg. Co., Bridgeport, Conn.

THOMPSON Grinder Co., Springfield, O.

VALLEY City Machine Works, Grand Rapids, Mich.

WALKER Grinder Co., Worcester, Mass.

WILMARTH & Morman Co., Grand Rapids, Mich.

SWING FRAME GRINDERS

PITTSBURG Emery Wheel Co., Pittsburg, Pa.

SAFETY Emery Wheel Co., Springfield, O.

TUCKER Machine Co., Cincinnati, O.

UNIVERSAL GRINDERS

AMERICAN Tool & Machine Co., Boston, Mass.

BROWN & Sharpe Mfg. Co., Providence, R. I.

CINCINNATI Grinder Co., Cincinnati, O.

CONOVER-OVERKAMP Machine & Tool Co., Dayton, O.

LANDIS Tool Co., Waynesboro, Pa. (See page 503.)

MODERN Tool Co., Erie, Pa.

NORTON Grinding Co., Worcester, Mass.

THOMPSON Grinder Co., Springfield, O.

WILMARTH & Marmon Co., Grand Rapids, Mich.

WET TOOL GRINDERS

BLOUNT Co., J. G., Dept. A., Everett, Mass. (See page 505.)

BRIDGEPORT Safety Emery Wheel Co., Bridgeport, Conn.

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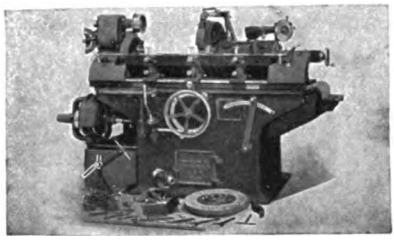
We Can Completely Equip Any Gas Engine or Automobile Grinding Department—Our Line:—

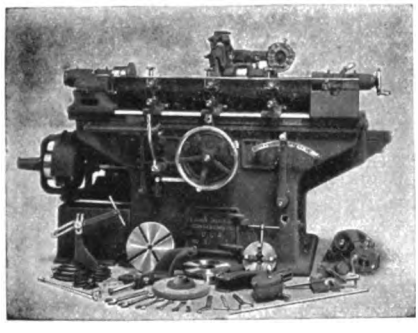


Landis Plain Grinder

Landis Plain Grinding Machines:—For line bearings of crank shafts—cam shaft bearings—valves (straight portion), push rods—pistons—piston rings—transmission shafts—axles, etc.

Landis Crank Grinder

Landis Crank Grinding Machine:—Capacity for single and multiple throw crank shafts with throws up to 8" single and 6" multiple.

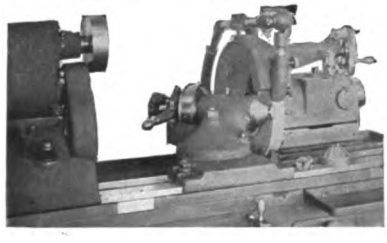


Landis Universal Grinder

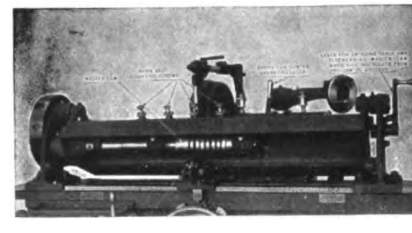
Landis Universal Grinding Machines:—For valves (straight and taper portions), magnetos—piston rings (face grind), besides for tools—jigs, bushings, etc. This machine grinds—straight or taper internal or external—and is adapted for use with attachments such as magnetic chuck—valve seat grinding attachment—cam grinding attachment—cutter attachments, etc.

Landis Internal Grinder

Landis Internal Grinding Machine:—Transmission and differential gears—piston pin bushings—can be arranged for use with water—or with quick acting collet chuck.



Valve Seat Attachment:—For valve seats; also any other work of like nature. Graduated for swiveling to 90°.



Landis Cam Grinding Attachment

Landis Cam Grinding Attachments:—For use on Landis Universal and Plain grinding machines, both detachable and integral cam grinding attachments are each built in 3 sizes to suit our machines.

LANDIS TOOL COMPANY, Waynesboro, Pa.

New York Office, Fulton Building, 50 Church Street, Walter H. Foster Company, Managers

AGENTS: Dewstoe Machine Tool Co., Birmingham, Ala. Harron, Rickard & McCone, San Francisco and Los Angeles. C. W. Burton Griffiths & Co., London and Glasgow. Schuchardt & Schutte, Berlin, Stockholm, St. Petersburg, Copenhagen. Alfred H. Schutte, Cologne, Brussels, Liege, Milan, Paris, Barcelona and Bilbao. Donauwerk Ernst Krause & Co., Wien, Prag and Budapest. A. R. Williams Machinery Co., Toronto. Williams & Wilson, Montreal, Canada. Andrews & George, Yokohama, Japan.

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GRINDERS (Continued)

WET TOOL GRINDERS (Continued)

CHALLENGE Machine Co., Philadelphia, Pa.

CHICAGO Machine Tool Co., Chicago, Ill.

DIAMOND Machine Co., Providence, R. I.

GISHOLT Machine Co., Madison, Wis.

HOYSRADT & Case, Kingston, N. Y.

LELAND-GIFFORD Co., Worcester, Mass.

LUTTER & Gies Co., Milwaukee, Wis-. "Milwaukee."

MILWAUKEE—See Lutter & Gies.

NORTHAMPTON Emery Wheel Co., Leeds, Mass.

RANSOM Mfg. Co., Oshkosh, Wis.

SELLERS & Co., Wm., Philadelphia, Pa.

SPRINGFIELD Mfg. Co., Bridgeport, Conn.

STERLING Grinding Wheel Co., Tiffin, O.

TAYLOR & Fenn Co., Hartford, Conn.

TUCKER Machine Co., Cincinnati, O.

VALLEY City Machine Works, Grand Rapids, Mich.

WEBSTER & Perks Tool Co., Springfield, O.

HAMMERS

BRASS AND COPPER HAMMERS

EUREKA Co., North East, Pa. (See page 257.)

GOODELL-PRATT Co., Greenfield, Mass.

GRAHAM & Co., James, 293 Wooster St., New Haven, Conn. (See page 209.)

HORAT, J., Lafayette, Ind.

ROSE, J. A., Hastings, Neb.

UNION Hardware Co., Torrington, Conn.

WELCH Co., Thomas F., Boston, Mass.

CLAW HAMMERS

ATHA Tool Co., Newark, N. J.

CENTRAL Hardware Co., Philadelphia, Pa.

CHENEY Hammer Co., H., Little Falls, N. Y.

MAYDOLE Hammer Co., David, Norwich, N. Y.

VAN DOREN Mfg. Co., Chicago Heights, Ill. "Vandor."

VANDOR—See Van Doren Mfg. Co.

VAUGHAN & Bushnell Mfg. Co., Chicago, Ill.

WARNER Hammer Co., Cromwell, Conn.

MACHINISTS HAMMERS

ATHA Tool Co., Newark, N. J.

BEALL Bros., Alton, Ill.

BILLINGS & Spencer Co., Hartford, Conn.

BUFFUM Tool Co., Louisiana, Mo.

CHENEY Hammer Co., H., Little Falls, N. Y.

DROP Forging Co. of New York, Jersey City, N. J. "Spartan."

EVANSVILLE Tool Works, Evansville, Ind.

HELLER Bros. Co., Newark, N. J.

HYDE Park Mfg. Co., Bernharts, Pa.

MAYDOLE Hammer Co., David., Norwich, N. Y.

PECK, Stow & Wilcox Co., Southington, Conn.

PERFECT HANDLE—See Smith & Co.

SMITH & Co., H. D., Plantsville, Conn. "Perfect Handle."

SPARTAN—See Drop Forging Co. of New York.

VAN DOREN Mfg. Co., Chicago Heights, Ill. "Vandor."

VANDOR—See Van Doren Mfg. Co.

VAUGHAN & Bushnell Mfg. Co., Chicago, Ill.

VLCHEK Tool Co., Cleveland, O.

WARNER Hammer Co., Cromwell, Conn.

PNEUMATIC HAMMERS

(See Tools, Pneumatic)

POWER HAMMERS

BEAUDRY & Co., Boston, Mass. "Champion," "Peerless."

BECHE—See Nazel Engineering & Machine Works.

BILLINGS & Spencer Co., Hartford, Conn.

BLISS Co., E. W., Brooklyn, N. Y.

BRADLEY & Son, C. C., Syracuse, N. Y.

CHAMPION—See Beaudry & Co.

CHAMPION Blower & Forge Co., Lancaster, Pa.

CLEVELAND Machine Specialty Co., Cleveland, O.

DIENELT & Eisenhardt, Philadelphia, Pa.

JUSTICE & Co., P. S., Philadelphia, Pa.

LITTLE GIANT—See Mayer Bros. Co.

McLANE, J. B., North Reading, Mass.

MAC Gowan & Finigan Foundry & Machine Co., St. Louis, Mo. "Perfect."

MASSILLON Foundry & Machine Co., Massillon, O.

MAYER Bros. Co., Mankato, Minn. "Little Giant."

MERRILL Bros. Co., Maspeth, N. Y.

NAZEL Engineering & Machine Works, Philadelphia, Pa. "Beche."

NILES-BEMENT-POND Co., New York, N. Y.

PEERLESS—See Beaudry & Co.

PERFECT—See MacGowan & Finigan Foundry & Machine Co.

PETTINGELL Machine Co., Amesbury, Mass.

QUICKWORK—See Smith, H. Collier.

SCRANTON & Co., New Haven, Conn.

SMITH, H. Collier, Detroit, Mich. "Quickwork."

TOLEDO Machine & Tool Co., Toledo, O.

WATERBURY Farrel Foundry & Machine Co., Waterbury, Conn.

WILLIAMS, White & Co., Moline, Ill.

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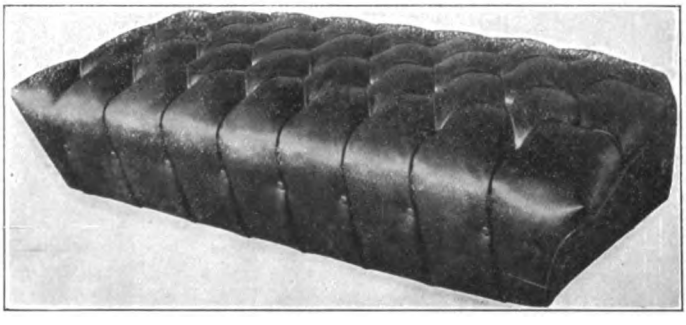

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12 Inches High in Front

This type of cushion is considered the acme of the Upholsterer's Art, and heretofore has been made only by hand. We are now in position to furnish devices (for which patents are pending) with which this type of cushion can be constructed at practically the same labor cost as the ordinary Soft-Faced or Spring-Edge Cushion.

Full particulars upon request.

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"Originators of Upholstering Devices."

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HAMMERS (Continued)

STEAM HAMMERS

ALLIANCE Machine Co., Alliance, O.

BELL—See Buffalo Foundry & Machine Co.

BUFFALO Foundry & Machine Co., Buffalo, N. Y. "Bell."

CHAMBERSBURG Engineering Co., Chambersburg, Pa.

ERIE Foundry Co., Erie, Pa.

McDOUGALL & Potter Co., New York, N. Y.

MASSILLON Foundry & Machine Co., Massillon, O.

MORGAN Engineering Co., Alliance, O.

NILES-BEMENT-POND Co., New York, N. Y.

HANDLES

FILE AND TOOL HANDLES

AMERICAN File Sharpener Co., Brooklyn, N. Y.

BLISS Mfg. Co., R., Pawtucket, R. I.

CASSADY-FAIRBANK Mfg. Co., Chicago, Ill.

CHAPIN-STEPHENS Co., Pine Meadow, Conn.

GROVER File Co., Nashua, N. H.

OHIO Tool Co., Charleston, W. Va.

OSGOOD, J. L., Buffalo, N. Y.

PIQUA Handle & Mfg. Co., Piqua, O.

SANDUSKY Tool Co., Sandusky, O.

TROY File Works, Troy, N. Y.

UNION Hardware Co., Torrington, Conn.

HEADS

BORING HEADS

MARVIN & Casler Co., Canastota, N. Y.

HEATERS

GLUE HEATERS

ADVANCE Machinery Co., Toledo, O. "Wetmore."

FRANCIS Co., Chas. E., Rushville, Ind.

WETMORE—See Advance Machinery Co.

SPECIAL GARAGE HEATERS

AUTO-HOT—See Kanneberg Roofing & Ceiling Co.

KANNEBERG Roofing & Ceiling Co., Canton, O. "Auto-Hot."

POSITIVE Supply Co., Davenport, Ia.

SCIENTIFIC Heater Co., Cleveland, O.

SUPERIOR Mfg. Co., Pittsburg, Pa.

HOLDERS

LATHE AND PLANER TOOL HOLDERS

ALMOND Mfg. Co., T. R., 1 Maple Ave., Ashburnham, Mass. (See page 537.)

AMERICAN Tool & Machine Co., Boston, Mass.

ARMSTRONG Bros. Tool Co., 304 N. Francisco Ave., Chicago, Ill. (See page 541.)

BILLINGS & Spencer Co., Hartford, Conn.

BOWN Machine Co., Battle Creek, Mich.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

CARR—See Thompson & Son Co.

CELFOR Tool Co., Buchanan, Mich.

CHAMPION—See Western Tool & Mfg. Co.

HANDY—See Morgan Mfg. Co.

MORGAN Mfg. Co., Newport, R. I. "Handy."

O. K. Tool Holder Co., Shelton, Conn.

READY Tool Co., Bridgeport, Conn. "Red-E."

RED-E—See Ready Tool Co.

THOMPSON & Son Co., Henry G., New Haven, Conn. "Carr."

TRIANGULAR Tool Co., Erie, Pa.

UNION Caliper Co., Orange, Mass.

VAN Doren Mfg. Co., Chicago Heights, Ill. "Vandor."

VANDOR—See Van Doren Mfg. Co.

WESTERN Tool & Mfg. Co., Springfield, O. "Champion."

HORSES

HORSES, TRESTLES AND TRUCKS

BERKERT & Son, William, Pittsburg (N. S.), Pa.

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. "Hildreth." (See page 425.)

HILDRETH—See Frasse & Co.

JOHNSTOWN Automobile Co., Johnstown, Pa.

NELSON Mfg. Co., Chicago, Ill.

INDICATORS

SPEED INDICATORS

BRAUNSDORF-MUELLER Co., Elizabeth N. J.

BROWN Instrument Co., Philadelphia, Pa.

DISSTON & Sons, Henry, Philadelphia, Pa.

GRANT Mfg. & Machine Co., Bridgeport, Conn. "Tabor."

McDONNELL Odometer Co., Chicago, Ill.

QUEEN-GRAY Co., Philadelphia, Pa.

STARRETT Co., L. S., Athol, Mass.

TABOR—See Grant Mfg. & Machine Co.

VEEDER Mfg. Co., Hartford, Conn.

WOODMAN Mfg. & Supply Co., R., Boston, Mass.

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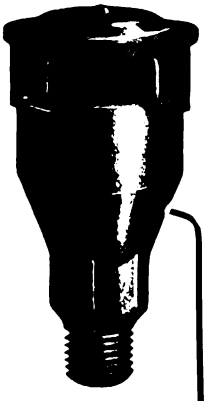
Our Keynote
"Progress"



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"APEX"
Oil Cups

Replacing Grease Cups on non-revolving Motor Car bearings, as they

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Feeds when car is in motion only.
Use on **Spring Bolts Steering Gear, etc.**

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OAK PARK, ILLINOIS.

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INSTRUMENTS

GAS ANALYSIS INSTRUMENTS.

COAPCO—See Combustion Appliances Co.

COMBUSTION Appliances Co., 1775 Lunt Ave., Chicago, Ill. "Coapco."

GEAR TESTING INSTRUMENTS.

FEICHT-BEVINGTON Mfg. Co., Cleveland, O.
(See page 511.)

GLEASON Works, 1000 University Ave., Rochester, N. Y.

MOTOR TESTING INSTRUMENTS

(For locating knocks in motors)

AMERICAN Electric Co., State & 64th Sts., Chicago, Ill. "Sonoscope."

BOSTON Talking Machine Co., Ames & Amherst Sts., Cambridge, Mass. "Detectorphone."

DETECTORPHONE—See Boston Talking Machine Co.

DINSHAH Sales Corp., New York, N. Y.

HOPEWELL Bros., Watertown, Mass. "Vibracator."
(See page 97.)

PILLING & Son Co., G. P., Arch & 23d Sts., Philadelphia, Pa. "Phonendoscope."

PHONENDOSCOPE—See Pilling & Son Co.

SONOSCOPE—See American Electric Co.

T A D.—See Toledo Devices Co.

TOLEDO Auto Devices Co., Toledo, O. "T A D."

VIBRACATOR—See Hopewell Bros.

RUBBER TESTING INSTRUMENTS

SHORE Instrument & Mfg. Co., New York, N. Y.

STEEL TESTING INSTRUMENTS

SCLEROSCOPE—See Shore Instrument & Mfg. Co.

SHORE Instrument & Mfg. Co., New York, N. Y. "Scleroscope."

IRONS

TUYERE IRONS

AMERICAN Foundry & Mfg. Co., St. Louis, Mo.

BOYNTON & Plummer, Worcester, Mass.

BUFFALO Forge Co., Buffalo, N. Y.

ILLINOIS Iron & Bolt Co., Carpentersville, Ill.

NATIONAL Novelty Corp., New York, N. Y.

ROOTS Co., P. H. & F. M., Connersville, Ind.

SWETT Iron Works, A. L., Medina, N. Y.

JOINTERS

GLUE JOINTERS

BERLIN Machine Works, Beloit, Wis.

FALLS Machine Co., Sheboygan Falls, Wis.

FAY & Egan Co., Cincinnati, O.

LINDERMAN Machine Co., Muskegon, Mich.

KETTLES

SODA AND POTASH KETTLES

BROWN & Sharpe Mfg. Co., Providence, R. I.

CLEVELAND Machine Specialty Co., Cleveland, O.

GRAY & Prior Machine Co., Hartford, Conn.

KOVEN & Bro., L. O., 50 Cliff St., New York, N. Y.
(See page 403.)

MANUFACTURING, Equipment & Engineering Co., Boston, Mass.

MATHER & Warchter, Cleveland, O.

KEYS

MACHINE KEYS

PENNSYLVANIA Shafting Co., Spring City, Pa.

STANDARD Gauge Steel Co., Beaver Falls, Pa.

WHITNEY Mfg. Co., Hartford, Conn. "Woodruff."
(See page 115.)

WOODRUFF—See Whitney Mfg. Co.

KNURLS

KNURLING WHEELS

ALERT Tool Co., 221-23 N. 23d St., Philadelphia, Pa.
(See page 533.)

ARMSTRONG Bros. Tool Co., 304 N. Francisco Ave., Chicago, Ill.
(See page 541.)

BILLINGS & Spencer Co., Hartford, Conn.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

MILLER Tool Co., New Britain, Conn.

O. K. Tool Holder Co., Shelton, Conn.

PRATT & Whitney Co., Hartford, Conn.
(See page 463.)

WELCH Co., Thomas F., Boston, Mass.

LACQUERS

METAL LACQUERS

AMERICAN Lacquer Co., Bridgeport, Conn.

ARLINGTON Co., 725-27 Broadway, New York, N. Y.
(See page 263.)

Complete Index to Classification appears on Pages 8 to 26.

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Automobile Soap Is Scarce

Here is something new in a cleanser for Washing Automobiles.

Puritan Green Lion Cleanser

One ounce is usually sufficient, two ounces will wash the dirtiest car.

Ask your jobber or write us for prices.

Puritan Soap Co.
Makers of Cleansers
Rochester, N. Y.

Automobile Axles *of* Known Quality

We Have Open Capacity for 1914 and are in position to handle contracts for the highest grade pleasure car axles for both gas cars and electrics.

Our pressed steel housing type rears are light in weight, unusually rigid and silent.

We are fully equipped to build to your specifications or furnish standard type. Materials and Workmanship fully guaranteed. Deliveries as you want them, assured. Write us before placing your contract.

Metal Products Company
Detroit, Michigan

SCHEBLER
THE STANDARD
CARBURETOR
OF THE WORLD

WHEELER & SCHEBLER
MANUFACTURERS
INDIANAPOLIS, : : U. S. A.

We are pioneers in Perfect Carburetion

WRITE FOR CATALOG

YEARS AHEAD OF ANY OTHER, IS

Shain's BALLSPRAY CARBURETOR
AN INSTRUMENT OF PRECISION
SEND FOR BOOKLET
CHAS. D. SHAIN, Box 53, Sta. L, Brooklyn, N. Y.

No Float or Needle Valve Required

AUTOMATICALLY SHUTS OFF WHEN THE ENGINE STOPS

PRICES

1 inch, ...	$ 6.00
1¼ inch, ...	8.00
1½ inch, ...	10.00

DISCOUNT TO THE TRADE

Also Manufacturer of
SHAIN'S { TERMINALS, IGNITION CABLES BATTERY CONNECTORS, Etc., Etc.

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LACQUERS (Continued)

METAL LACQUERS (Continued)

BARRETT & Co., M. L., Chicago, Ill.

CELLULOID Zapon Co., New York, N. Y.

EGYPTIAN Lacquer Mfg. Co., New York, N. Y.

HANSON & Van Winkle Co., Newark, N. J.

KALBFLEISCH Co., Franklin H., Broadway & 16th St., New York, N. Y. (See page 319.)

MAAS & Waldstein Co., New York, N. Y.

NIKOLAS & Co., G. J., Chicago, Ill.

ZINSSER & Co., W., New York, N. Y.

LATHES

BENCH OR PRECISION LATHES

AMERICAN Watch Tool Co., Waltham, Mass.

AMES & Co., B. C., Waltham, Mass.

ELGIN Tool Works, Elgin, Ill.

GOODELL-PRATT Co., Greenfield, Mass.

HARDINGE Bros., Chicago, Ill.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

REMINGTON Tool & Machine Co., Woburn, Mass.

RIVETT Lathe & Grinder Co., Boston, Mass.

ROCKFORD Lathe & Drill Co., Rockford, Ill.

SLOAN & Chace Mfg. Co., Newark, N. J.

SOUTH Bend Lathe Works, 600 E. Madison St., South Bend, Ind. (See page 511.)

STARK Tool Co., Waltham, Mass. (See page 511.)

TAYLOR & Fenn Co., Hartford, Conn.

VAN NORMAN Machine Tool Co., Springfield, Mass.

WALTHAM Machine Works, Waltham, Mass.

BUFFING LATHES

(See Machines, Buffing and Polishing)

CRANK PIN LATHES

AMERICAN Tool Works Co., Cincinnati, O.

BOGERT, John L., Flushing, N. Y.

LODGE & Shipley Machine Tool Co., Cincinnati, O.

TINDELL-MORRIS Co., Eddystone, Pa.

ENGINE LATHES

AMERICAN Tool Works Co., Cincinnati, O.

BARKER & Co., Wm., Covington, Ky.

BARNES Co., W. F. & John, Rockford, Ill.

BARNES Drill Co., Rockford, Ill.

BOYE & Emmes Machine Tool Co., Cincinnati, O.

BRADFORD Machine Tool Co., Cincinnati, O.

CARROLL-JAMIESON Machine Tool Co., Batavia, O.

CHAMPION Tool Works Co., Cincinnati, O.

CINCINNATI Lathe & Tool Co., Cincinnati, O.

CONOVER-OVERKAMP Machine & Tool Co., Dayton, O.

DAVIS Machine Co., W. P., Rochester, N. Y Mass. "Lo-Swing."

GREAVES-KLUSMAN Tool Co., Cincinnati, O.

HAMILTON Machine Tool Co., Hamilton, O.

HENDEY Machine Co., Torrington, Conn.

FAY Machine Tool Co., Philadelphia, Pa.

FITCHBURG Machine Works, Fitchburg, Mass.

FLATHER & Co., Nashua, N. H.

LE BLOND Machine Tool Co., R. K., Cincinnati, O.

LO-SWING—See Fitchburg Machine Works.

LODGE & Shipley Machine Tool Co., Cincinnati, O.

MORRIS Machine Tool Co., John B., Cincinnati, O.

MUELLER Machine Tool Co., Cincinnati, O.

NEW Haven Mfg. Co., New Haven, Conn.

NILES-BEMENT-POND Co., New York, N. Y.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

PUTNAM Machine Co., Fitchburg, Mass.

RAHN-LARMON Co., Cincinnati, O.

REED-PRENTICE Co., Worcester, Mass.

ROBBINS Machine Co., Worcester, Mass.

ROCKFORD Lathe & Drill Co., Rockford, Ill.

ROCKFORD Tool Co., Rockford, Ill.

SEBASTIAN Lathe Co., Cincinnati, O.

SENECA Falls Mfg. Co., Seneca Falls, N. Y. "Star."

SHEPARD Lathe Co., Cincinnati, O.

SOUTH Bend Lathe Works, 600 E. Madison St., South Bend, Ind. (See page 511.)

SPRINGFIELD Machine Tool Co., Springfield, O.

STAPF & Co., John B., Dunkirk, N. Y.

STAR—See Seneca Falls Mfg. Co.

VON Wyck Machine Tool Co., Cincinnati, O.

WALCOTT & Wood Machine Tool Co., Jackson, Mich.

WHITCOMB-BLAISDELL Machine Tool Co., Worcester, Mass.

WILLARD Machine & Tool Co., Cincinnati, O.

FORMING LATHES

MERIDEN Machine Tool Co., Meriden, Conn. "Yankee."

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

WARNER & Swasey Co., Cleveland, O.

YANKEE—See Meriden Machine Tool Co.

POLISHING LATHES

(See Machines, Buffing and Polishing)

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SOUTH BEND LATHES

For the Machine and Repair Shop

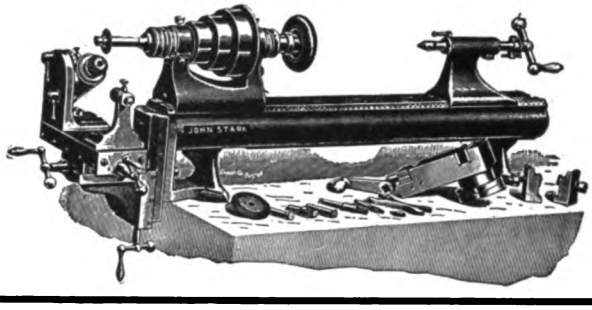
Straight or Gap Beds

11 inch	Lathe,	complete,		$100.00
12 "	"	"		125.00
13 "	"	"		165.00
15 "	"	"		200.00
16 "	"	"		250.00
18 "	"	"		300.00

Send for free catalog giving prices on our entire line.

South Bend Lathe Works 600 E. Madison St. **South Bend, Ind.**

STARK NO. 4 BENCH LATHE

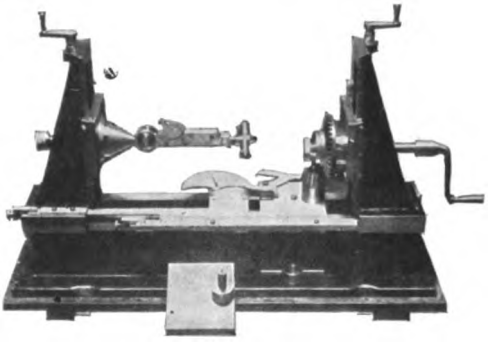


With Milling Machine Attachment

Length of bed, 38 inches—swing 9 inches—capacity of chuck ¾-in.—weight 185 lbs.

STARK LATHE ACCURACY is known and appreciated wherever bench tools are used. We have had 48 years' experience in building these lathes and can guarantee their efficiency absolutely. Ask today for our descriptive Catalogue No. 25.

STARK TOOL COMPANY
Waltham, Mass.



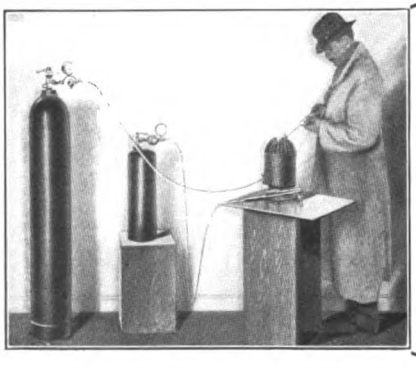
The biggest money saver of the age

The Universal-Bevel-Spur and Spiral Gear testing instrument

Manufactured by

Feicht-Bevington Mfg. Co.

Cleveland, O.



Three In One Midget

WELDING, CUTTING AND DECARBONIZING MACHINE **$35**

The Lowest Priced and Best Outfit Manufactured

PORTABLE AND STATIONARY GASOLINE TANKS
LONG DISTANCE SELF-MEASURING PUMPS

Write us for Details

F. C. SANFORD MFG. CO., Bridgeport, Conn.

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LATHES (Continued)

PRECISION LATHES

(See Lathes, Bench or Precision)

TURRET LATHES

ACME Machine Tool Co., Cincinnati, O.
AMERICAN Tool Works Co., Cincinnati, O.
AMERICAN Tool & Machine Co., Boston, Mass.
BARDONS & Oliver, Cleveland, O.
BOGERT, John L., Flushing, N. Y.
BOYE & Emmes Machine Tool Co., Cincinnati, O.
BRADFORD Machine Tool Co., Cincinnati, O.
BULLARD Machine Tool Co., Bridgeport, Conn.
DAVIS Machine Co., W. P., Rochester, N. Y.
DRESES Machine Tool Co., Cincinnati, O.
FAY & Scott, Dexter, Me.
FOSTER Machine Co., Elkhart, Ind.
GARVIN Machine Co., New York, N. Y.
GISHOLT Machine Co., Madison, Wis.
HAMILTON Machine Tool Co., Hamilton, O.
HARTNESS—See Jones & Lamson Machine Co.
INTERNATIONAL Machine Tool Co., Indianapolis, Ind. "Libby."
JONES & Lamson Machine Co., Springfield, Vt. "Hartness."
LE BLOND Machine Tool Co., R. K., Cincinnati, O.
LIBBY—See International Machine Tool Co.
LODGE & Shipley Machine Tool Co., Cincinnati, O.
MERIDEN Machine Tool Co., Meriden, Conn.
MODERN Machine Tool Co., Cincinnati, O.
NEW Britain Machine Co., 10 Bigelow St., New Britain, Conn. (See page 519.)
POTTER & Johnston Machine Co., Pawtucket, R. I.
PRATT & Whitney Co., Hartford, Conn. (See page 463.)
RAHN-LARMON Co., Cincinnati, O.
REED-PRENTICE Co., Worcester, Mass.
SPRINGFIELD Machine Tool Co., Springfield, O.
STEINLE Turret Machine Co., Madison, Wis.
WALCOTT & Wood Machine Tool Co., Jackson, Mich.
WARNER & Swasey Co., Cleveland, O.
WELLS & Son Co., F. E., Greenville, Mass.
WOOD Turret Machine Co., Brazil, Ind.

WOODWORKING LATHES

AMERICAN Saw Mill Machinery Co., New York, N. Y.
AMERICAN Woodworking Machinery Co., Rochester, N. Y.
CORDESMAN-RECHTIN Co., Cincinnati, O.
DEFIANCE Machine Works, Defiance, O.
FAY & Egan Co., J. A., Cincinnati, O.
FAY & Scott, Dexter, Me.
GREAVES-KLUSMAN Tool Co., Cincinnati, O.
OBER Mfg. Co., Chagrin Falls, O.
OLIVER Machinery Co., Grand Rapids, Mich.
PORTER Machinery Co., C. O., Grand Rapids, Mich.
POWER & Co., L., Philadelphia, Pa.
ROBBINS Machine Co., Worcester, Mass.
ROOT Co., B. M., York, Pa.
SMITH Machine Co., H. B., Smithville, N. J.
VALLEY City Machine Works, Grand Rapids, Mich.

LETTERS

PATTERN LETTERS

BENSKIN Mfg. Co., Canton, O. "Perfect."
BRIM, A. W., Seneca Falls, N. Y.
BUTLER, A. G., New York, N. Y.
CLEVELAND Galvanizing Works Co., Cleveland, O.
DIAMOND Clamp & Flask Co., Richmond, Ind.
EVERETT & Son, A., Auburn, N. Y.
KNIGHT & Son, H. W., Seneca Falls, N. Y.
PERFECT—See Benskin Mfg. Co.
SHANAFELT Mfg. Co., Canton, O.
TIMMIS & Clissold, Bound Brook, N. J.
WELLMAN Pattern-Supply Co., Cleveland, O

LEVELS

SPIRIT LEVELS

ATHOL Machine Co., Athol, Mass.
CHAPIN-STEPHENS Co., Pine Meadow, Conn.
COLUMBIA—See Smith, E. G.
COOK—See Gould & Jackson.
DISSTON & Sons, Henry, Philadelphia, Pa.
GOODELL-PRATT Co., Greenfield, Mass.
GOULD & Jackson, Watertown, N. Y. "Cook."
SMITH, E. G., Columbia, Pa. "Columbia."
STANLEY Rule & Level Co., New Britain, Conn.
STARRETT Co., L. S., Athol, Mass.

LOCKERS

METAL CLOTHES LOCKERS

BUFFALO Wire Works Co., Buffalo, N. Y.
CARPENTER-McWATTERS Co., Cleveland, O.
CLARK Co., W. J., Salem, O.
DARBY & Sons Co., Edward, Philadelphia, Pa.
DURAND-STEEL Locker Co., Chicago, Ill.
FEDERAL Steel Fixture Co., Chicago, Ill.

Complete Index to Classification appears on Pages 8 to 26.

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Hartford
AUTO COMFORT
EQUIPMENT

Modern automobile accessories of merited distinction, each a quality product and the leader in its class—designed to ensure comfort, to promote economy, and to increase the factor of safety.

Truffault-Hartford
SHOCK ABSORBER

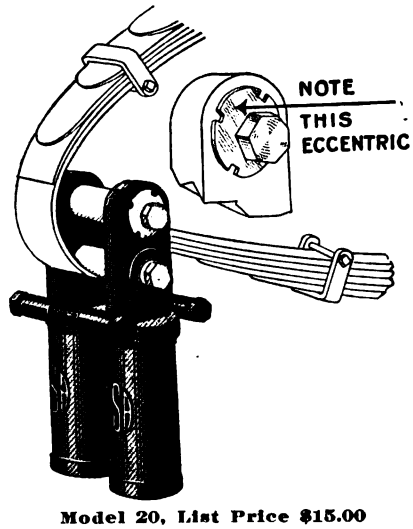
"The Pioneer and the Best." Increases tire mileage, prevents spring breakage, overcomes destructive vibration and "Makes Every Road a Boulevard." 250,000 motorists are enjoying its use. 25 leading makers have adopted it as regular equipment.

HARTFORD BUMPER
Beautifies a car and makes collisions harmless.

HARTFORD CUSHION SPRING
Gives spring flexibility when spring flexibility is desired and maximizes comfort.

HARTFORD AUTO JACK
The ultimate Jack—regular equipment on the best cars.

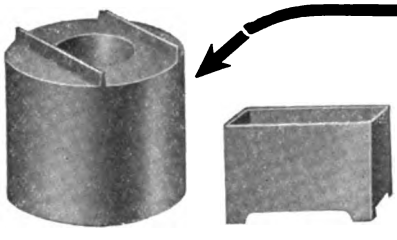
HARTFORD SUSPENSION CO.
E. V. Hartford, Pres.
Main Office and Works, 172 Bay St.
Jersey City, N. J.
Branches and distributors in principal cities.
Dealers everywhere.



Model 20, List Price $15.00

THE NATIONAL LINE FOR 1915
is complete. We manufacture a complete line of Shock Absorbers and Bumpers. Catalogue now ready.
Get our Jobbers Proposition.

National Shock Absorber Co.
GRAND RAPIDS, MICH.



"PYRO"
Steel Castings

For Lead, Cyanide, Chloride Pots and Carbonizing Boxes. Increases Efficiency and Economy, as the life of "Pyro" Steel for this purpose has been demonstrated to be three and four times greater than any other known material.

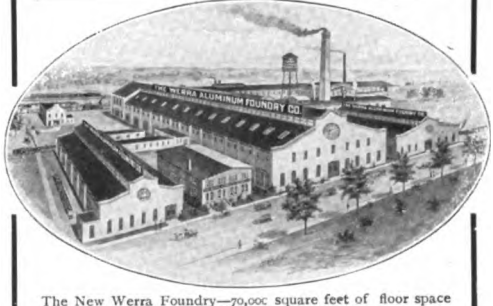
Our Cyanide Pots have been known to stand 600 continuous hours in service under heat—a record produced by no other material.

We have just issued a new catalog that is yours for the asking.

Swedish Crucible Steel Company
Detroit, Mich.

Manufacturers of a general line of regular and special alloy steel castings from one pound to five tons.

ALUMINUM CASTINGS



The New Werra Foundry—70,000 square feet of floor space

Automobile and Motorcycle Castings Our Specialty

We will guarantee deliveries of any quantity on specified dates. Let us figure with you.

Werra Aluminum Foundry Co.
Waukesha, Wis.

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LOCKERS (Continued)

METAL CLOTHES LOCKERS (Continued)

HART & Hutchinson Co., New Britain, Conn.

HETTS Co., Detroit, Mich.

JEFFERIS Co., R. W., Camden, N. J.

LYON Metallic Mfg. Co., Aurora, Ill.

MANUFACTURING, Equipment & Engineering Co., Boston, Mass.

MERRITT & Co., Camden, N. J.

SMITH Wire & Iron Works, F. P., Chicago, Ill.

TERRELL'S Equipment Co., Grand Rapids, Mich.

VAN Dorn Iron Works, Cleveland, O.

LUBRICANTS

CUTTING LUBRICANTS

ACME—See Cataract Refining & Mfg. Co.

AJAX—See Phoenix Oil Co.

CASCADE—See Cataract Refining & Mfg. Co.

CATARACT Refining & Mfg. Co., Buffalo, N. Y. "Mystic," "Acme," "Cascade."

CUT-RITE—See Phoenix Oil Co.

FAULTLESS—See Hawkeye Oil Co.

FOOTE, Pierson & Co., New York, N. Y. "Lubria."

HAWKEYE Oil Co., Waterloo, Ia. "Faultless."

HAWS, Geo. A., 142-44 Front St., New York, N. Y. (See page 277.)

HOUGHTON & Co., E. F., Philadelphia, Pa.

L-O—See Richards, G. Whitfield.

LUBE-WELL—See Richards, G. Whitfield.

LUBRI-KOOL—See Richards, G. Whitfield.

LUBRIA—See Foote, Pierson & Co.

MYSTIC—See Cataract Refining & Mfg. Co.

NAGLENE—See Ulco Oil Co.

PHOENIX Oil Co., Cleveland, O. "Ajax," "Cut-rite."

RICHARDS, G. Whitfield, Philadelphia, Pa. "Lube-Well," "L-O," "Lubri-Kool."

ULCO Oil Co., Detroit, Mich. "Naglene."

MACHINERY

DEALERS IN MACHINERY

(This is a list of Dealers in Machinery who advertise in this Publication)

FRASSE & Co., Peter A., 417-21 Canal St., New York, N. Y. (See page 425.)

MONTGOMERY & Co., 105-07 Fulton St., New York, N. Y. (See page 501.)

SAND MIXING AND CONVEYING MACHINERY

BARBOUR-STOCKWELL Co., Cambridgeport, Mass.

PANGBORN Corp., Hagerstown, Md.

STANDARD Sand & Machine Co., Cleveland, O.

MACHINES

ABRASIVE METAL CUTTING MACHINES

SLACK Mfg. Co., Springfield, Vt.

AUTOGENOUS WELDING MACHINES

ADMIRAL Welding Machine Co., Kansas City Mo.

ASHTON, Laird & Co., New York, N. Y. "Astra."

ASTRA—See Ashton, Laird & Co.

BUCKEYE—See Macleod Co.

COX Brass Mfg. Co., Albany, N. Y. (See page 357.)

DAVIS-BOURNONVILLE Co., Jersey City, N. J.

DYER Apparatus Co., Cambridge, Mass.

ECONOMY Welding Machine Co., Kansas City, Mo.

ELLINGER Mfg. Co., Walter, Sheboygan, Wis.

ENGINEERING Sales Corp., Chicago, Ill.

GENERAL Welding Co., Hoboken, N. J.

GOODYEAR, Nelson, New York, N. Y.

HAVENS Bros. Mfg. Co., Denver, Colo.

HEITHECKER, A., 18 Dunham Pl., Brooklyn, N. Y. (See page 515.)

HENDERSON-WILLIS Welding & Cutting Co., St. Louis, Mo.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. (See page 83.)

JAHNKE Welding & Supply Co., San Francisco, Cal.

MACLEOD Co., Walter, Cincinnati, O. "Buckeye."

MANUFACTURERS Welding Co., Brooklyn, N. Y. "U. O. C."

MESSER & Co., Philadelphia, Pa.

METAL Welding & Supply Co., Denver, Colo.

METALS Welding Co., Cleveland, O.

MILBURN Co., Alexander, Baltimore, Md.

NORTHERN Welding Co., Minneapolis, Minn. "Vulcan."

OXWELD Acetylene Co., Chicago, Ill.

OXY-CARBI Co., New Haven, Conn.

PREST-O-LITE Co., 1400 Speedway, Indianapolis, Ind. (See page 515.)

RICE & Dayton Mfg. Co., Cedar Falls, Ia.

RUSS—See Stewart Auto Accessories Co.

SANFORD Mfg. Co., F. C., Bridgeport, Conn. (See page 511.)

Complete Index to Classification appears on Pages 8 to 26.

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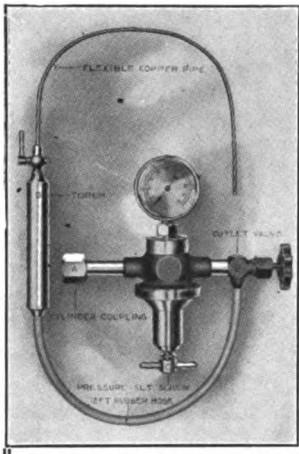
For Garages and Service Stations



One of the commonest jobs you are called upon to handle is removing carbon from cylinders. It is mean, nasty, unprofitable work, unless you have the device here illustrated. Thousands of them have been sold throughout the United States because they save time and labor and make cylinder cleaning profitable. The outfit is exactly as illustrated and is used with an oxygen tank, which you don't have to buy, but each filling of which, while it costs you $2, will enable you to do from $20 to $30 worth of work with my Carbon Remover.

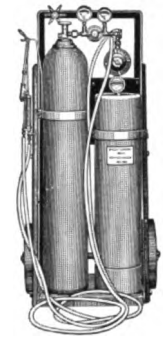
I also make outfits for welding purposes and carbonic acid gas reducing valves.

Prices and information upon request.

A. HEITHECKER, 18 Dunham Place, Brooklyn, N. Y.

Prest-O-Welder

A convenient, portable, economical outfit for oxy-acetylene welding and cutting, and for



Removing Carbon with Oxygen

Write for details of our Service Plan on welding gas.

Prest-O-Torch (acetylene), the most convenient, efficient blow torch for soldering and brazing.

Prest-O-Liter lights, dims and extinguishes gas lamps from the dash.

The Prest-O-Lite Co., Inc.

1400 Speedway **Indianapolis**

Buffalo Auto Pumps

The word with us is "not how many, but how good."

But this means that we make a good many Pumps. If you want a fast, easy-working, thoroughly well-made and reliable Pump, get our Apex at $6, Zenith at $3, or Magic at $2.75. All our Pumps are equipped with "B" leather packings—strongest and longest wearing.

Send for our literature and discounts.

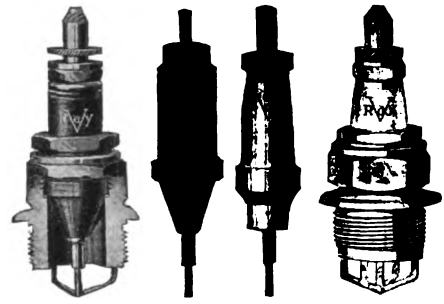
Manufactured by

Buffalo Auto Accessory Manufacturing Company, Inc.,

369 Ellicott Street,

BUFFALO : : : NEW YORK

THE V-RAY PLUG



'MIKA" Plug (Sectional) | "MIKA" CORE | PORCELAIN CORE | PORCELAIN PLUG

Less than 1-2 of 1% of the 1,300,000

V-Rays

in everyday use have ever defaulted for any reason.

THE V-RAY CO.

At all Jobbers **Marshalltown, Ia.** **At all Dealers**

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MACHINES (Continued)

AUTOGENOUS WELDING MACHINES (Continued)

SCHAAP Automobile Co., Brooklyn, N. Y.

STEWART Auto Accessories Co., Chicago, Ill. "Russ."

TOLMAN Mfg. Co., 19-21 W. Third St., Boston, Mass. (See page 519.)

TURNER Brass Works, Sycamore, Ill.

U. O. C.—See Manufacturers Welding Co.

VULCAN—See Northern Welding Co.

VULCAN Brazing & Machine Co., 310-12 N. 16th St., Philadelphia, Pa. (See page 521.)

WATERHOUSE Welding Co., Boston, Mass.

WELDRITE Co., Long Island City, N. Y.

WESTERN Welding & Mfg. Co., Chicago, Ill.

BLUE PRINTING MACHINES

BLUE Streak—See Revolute Machine Co.

BUCKEYE Engine Co., Salem, O.

KEUFFEL & Esser Co., Hoboken, N. J.

PEASE Co., C. F., Chicago, Ill.

REVOLUTE Machine Co., New York, N. Y. "Blue Streak."

BOLT HEADING MACHINES

ACME Machinery Co., Cleveland, O.

AJAX Mfg. Co., Cleveland, O.

BROWN Co., H. B., East Hampton, Conn. "Davis."

BURDICT—See Howard Iron Works.

COOK Co., Asa S., Hartford, Conn.

DAVIS—See Brown Co.

HOWARD Iron Works, Buffalo, N. Y. "Burdict."

NATIONAL Machinery Co., Tiffin, O.

NEW Doty Mfg. Co., Jamesville, Wis.

NILES-BEMENT-POND Co., New York, N. Y.

PAWTUCKET Mfg. Co., Pawtucket, R. I.

BOLT POINTING MACHINES

ACME Machinery Co., Cleveland, O.

BROWN Co., H. B., East Hampton, Conn. "Merriman."

BURDICT—See Howard Iron Works.

COOK Co., Asa S., Hartford, Conn.

HOWARD Iron Works, Buffalo, N. Y. "Burdict."

LANDIS Machine Co., Waynesboro, Pa.

MERRIMAN—See Brown Co.

NATIONAL Machinery Co., Tiffin, O.

NILES-BEMENT-POND Co., New York, N. Y.

PAWTUCKET Mfg. Co., Pawtucket, R. I.

WEBSTER & Perks Tool Co., Springfield, O.

BOLT THREADING MACHINES

ACME Machinery Co., Cleveland, O.

BROWN Co., H. B., East Hampton, Conn. "Merriman."

BURDICT—See Howard Iron Works.

COOK Co., Asa S., Hartford, Conn.

FOOTE-BURT Co., Cleveland, O. "Reliance."

GREEN RIVER—See Greenfield Tap & Die Co.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Little Giant," "Green River."

HERCULES—See Wells & Son Co.

HOWARD Iron Works, Buffalo, N. Y. "Burdict."

LANDIS Machine Co., Waynesboro, Pa.

LITTLE GIANT—See Greenfield Tap & Die Co.

MERRIMAN—See Brown Co.

NATIONAL Machinery Co., Tiffin, O.

NILES-BEMENT-POND Co., New York, N.Y.

PAWTUCKET Mfg. Co., Pawtucket, R. I.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

RELIANCE—See Foote-Burt Co.

WEBSTER & Perks Tool Co., Springfield, O.

WELLS & Son Co., F. E., Greenfield, Mass. "Hercules."

BORING MACHINES

(Horizontal)

BEAMAN & Smith Co., Providence, R. I.

BINSSE Machine Co., Harrison, N. J.

ESPEN-LUCAS Machine Works, Philadelphia, Pa.

GISHOLT Machine Co., Madison, Wis.

LUCAS Machine Tool Co., Cleveland, O.

NILES-BEMENT-POND Co., New York, N. Y.

UNIVERSAL Boring Machine Co., Hudson, Mass.

BORING MACHINES

(Vertical)

BAKER Bros., Toledo, O.

BEAMAN & SMITH Co., Providence, R. I.

BULLARD Machine Tool Co., Bridgeport, Conn.

CINCINNATI Planer Co., Cincinnati, O.

COLBURN Machine Tool Co., Franklin, Pa.

FOOTE-BURT Co., Cleveland, O.

HOEFER Mfg. Co., Freeport, Ill.

KING Machine Tool Co., Cincinnati, O.

MOLINE Tool Co., Moline, Ill.

NILES-BEMENT-POND Co., New York, N. Y.

Complete Index to Classification appears on Pages 8 to 26.

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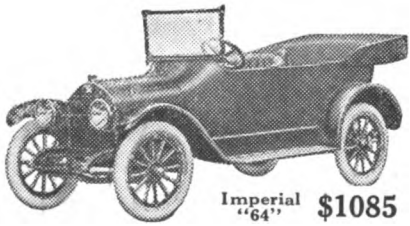

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MACHINES (Continued)

BUFFING AND POLISHING MACHINES

BENNETT-O'CONNELL Co., Chicago, Ill.

BLOUNT Co., J. G., Dept. A, Everett, Mass. (See page 505.)

BRIDGEPORT Safety Emery Wheel Co., Bridgeport, Conn.

BUILDERS Iron Foundry, Providence, R. I.

CHALLENGE Machine Co., Philadelphia, Pa.

DIAMOND Machine Co., Providence, R. I.

GARDNER Machine Co., Beloit, Wis.

NEW Britain Machine Co., 10 Bigelow St., New Britain, Conn. (See page 519.)

NORTHAMPTON Emery Wheel Co., Leeds, Mass.

RANSOM Mfg. Co., Oshkosh, Wis.

ST. LOUIS Machine Tool Co., St. Louis, Mo. "Western."

SIBLEY-HOUFLEY Machine Co., Detroit, Mich. "Garland."

SPRINGFIELD Mfg. Co., Bridgeport, Conn.

STEVENS, Frederic B., Detroit, Mich. (See pages 527 and 528.)

VALLEY City Machine Works, Grand Rapids, Mich.

WEBSTER & Perks Tool Co., Springfield, O.

WESTERN—See St. Louis Machine Tool Co.

CAM CUTTING MACHINES

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

STANDARD Machinery Co., Auburn, R. I. (See page 443.)

CORE MAKING MACHINES

BROWN Specialty Machinery Co., Chicago, Ill. "Hammer."

DIAMOND Clamp & Flask Co., Richmond, Ind.

HAMMER—See Brown Specialty Machinery Co.

CORE WIRE STRAIGHTENING AND CUTTING MACHINES

BLAKE & Knowles Steam Pump Works, East Cambridge, Mass. "Climax."

CLIMAX—See Blake & Knowles Steam Pump Works.

GREGG Mfg. Co., Cleveland, O.

CRIMPING AND BEADING MACHINES

NIAGARA Machine & Tool Works, Buffalo, N. Y.

PECK, Stow & Wilcox Co., Southington, Conn.

PETTINGELL Machine Co., Amesbury, Mass.

STOLL Co., D. H., Buffalo, N. Y.

CUTTING-OFF MACHINES

BROWN & Sharpe Mfg. Co., Providence, R. I.

DAVIS Machine Co., W. P., Rochester, N. Y.

HURLBURT-ROGERS Machine Co., South Sudbury, Mass.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

DRILLING MACHINES

(See Drills)

ELECTRIC WELDING MACHINES

AGNEW Electric Welder Co., Detroit, Mich.

C. & C. Electric & Mfg. Co., Garwood, N. J.

GEUDER, Paeschke & Frey Co., 1363-1700 St. Paul Ave., Milwaukee, Wis. (See page 169.)

NATIONAL Electric Welder Co., Warren, O.

THOMSON Electric Welding Co., Lynn, Mass.

TOLEDO Electric Welder Co., Cincinnati, O.

UNIVERSAL Electric Welding Co., New York, N. Y.

WINFIELD Electric Welding Machine Co., Warren, O.

FILING MACHINES

AMES & Co., B. C., Waltham, Mass.

COCHRANE-BLY Co., Rochester, N. Y.

HARTFORD—See Robinson Tool Works.

ROBINSON Tool Works, Waterbury, Conn. "Hartford."

GEAR CUTTING MACHINES

BROWN & Sharpe Mfg. Co., Providence, R. I.

CINCINNATI Gear Cutting Machine Co., Cincinnati, O.

FELLOWS Gear Shaper Co., Springfield, Vt.

FLATHER Mfg. Co., E. J., Nashua, N. H.

GARVIN Machine Co., New York, N. Y.

GLEASON Works, Rochester, N. Y.

GOULD & Eberhardt, Newark, N. J.

GRANT-LEES Gear Co., 2368 69th St., Cleveland, O. (See page 539.)

LEES-BRADNER Co., Cleveland, O.

NEWARK Gear Cutting Machine Co., 67-69 Prospect St., Newark, N. J. (See page 437.)

SCHUCHARDT & Schutte, New York, N. Y. (Importers.)

SLOAN & Chace Mfg. Co., Newark, N. J.

STANDARD Mfg. Co., Bridgeport, Conn.

WHITON Machine Co., D. E., New London, Conn.

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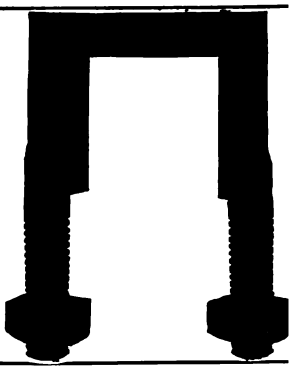

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MACHINES (Continued)

GEAR HOBBING MACHINES

ADAMS Co., Dubuque, Ia.

BARBER-COLMAN Co., Rockford, Ill.

GOULD & Eberhardt, Newark, N. J.

LEES-BRADNER Co., Cleveland, O.

MEISSELBACH-CATUCCI Mfg. Co., Newark, N. J.

NEWARK Gear Cutting Machine Co., 67-69 Prospect St., Newark, N. J. (See page 437.)

REYNOLDS Pattern & Machine Co., Moline, Ill.

SCHUCHARDT & Schutte, New York, N. Y. (Importers.)

GEAR TOOTH CHAMFERING MACHINES

INGLE Corp., Rochester, N. Y.

SCHUCHARDT & Schutte, New York, N. Y. (Importers.)

HAIR PICKING MACHINES

LOUNSBERY & Sons, G. H., Cincinnati, O.

PRIZE—See Willcomb Co.

WILLCOMB Co., Geo., Boston, Mass. "Prize."

KEY SEATING MACHINES

BAKER Bros., Toledo, O. "Colburn."

BURR & Sons, John T., Brooklyn, N. Y.

COLBURN—See Baker Bros.

DAVIS Machine Co., W. P., Rochester, N. Y.

GIANT—See Mitts & Merrill.

LAPOINTE Machine Tool Co., Hudson, Mass.

MITTS & Merrill, Saginaw, Mich. "Giant."

NATIONAL Machine Tool Co., Cincinnati, O.

NILES-BEMENT-POND Co., New York, N. Y.

PAWTUCKET Mfg. Co., Pawtucket, R. I.

LEATHER MEASURING MACHINES

NIGHTINGALE, J. E., Danvers, Mass.

TUFTING Machine Supply Co., 268 Jefferson Ave. E., Detroit, Mich. **(See page 505.)**

TURNER Tanning Machinery Co., Peabody, Mass.

MARKING MACHINES

GORTON Machine Co., George, Racine, Wis.

MILLING MACHINES

ADAMS Co., Dubuque, Ia.

BEAMAN & Smith Co., Providence, R. I.

BECKER Milling Machine Co., Hyde Park, Mass.

BRIGGS—See Gooley & Edlund.

BROWN & Sharpe Mfg. Co., Providence, R. I.

BURKE Machine Tool Co., Conneaut, O.

CARTER & Hakes Co., Winsted, Conn.

CHICAGO Machine Tool Co., Chicago, Ill.

CINCINNATI Milling Machine Co., Cincinnati, O.

FOSDICK Machine Tool Co., Cincinnati, O.

FOX Machine Co., Grand Rapids, Mich.

GARVIN Machine Co., New York, N. Y.

GOOLEY & Edlund, Syracuse, N. Y. "Briggs."

HENDEY Machine Co., Torrington, Conn.

INGERSOLL Milling Machine Co., Rockford, Ill.

KEARNEY & Trecker Co., Milwaukee, Wis. "Milwaukee."

KEMPSMITH Mfg. Co., Milwaukee, Wis.

KNIGHT Machinery Co., W. B., St. Louis, Mo.

LE BLOND Machine Tool Co., R. K., Cincinnati, O.

MILWAUKEE—See Kearney & Trecker Co.

OESTERLEIN Machine Co., Cincinnati, O. "Ohio."

OHIO—See Oesterlein Machine Co.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

ROCKFORD Machine Tool Co., Rockford, Ill.

ROCKFORD Milling Machine Co., Rockford, Ill.

SLOAN & CHACE Mfg. Co., Newark, N. J.

STEPTOE Shaper Co., John, Cincinnati, O.

THURSTON Mfg. Co., Providence, R. I.

VALLEY City Machine Works, Grand Rapids, Mich.

VAN NORMAN Machine Tool Co., Springfield, Mass.

WHITNEY Mfg. Co., Hartford Conn. (See page 115.)

MOTOR DECARBONIZING MACHINES

(See also Compounds, Carbon; also Removers, Carbon)

ASHTON, Laird & Co., New York, N. Y. "Astra."

ASTRA—See Ashton, Laird & Co.

AUTO Gas Light Co., Hazelton, Pa. "M-E."

BATEMAN Bros., Centerville, Ia. "O-So-Easy."

BROWN Co., Syracuse, N. Y.

CHAMPION—See Cleveland Faucet Co.

CLEVELAND Faucet Co., Cleveland, O. "Champion."

COX Brass Mfg. Co., Albany, N. Y. (See page 357.)

DYER Apparatus Co., Cambridge, Mass.

FERRIER Mfg. Co., G. F., Pittsburg, Pa.

GENERAL Welding Co., Hoboken, N. J.

HEITHECKER, A., 18 Dunham Pl., Brooklyn, N. Y. (See page 515.)

HILT Co., R., Boston, Mass.

IMPERIAL Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. (See page 83.)

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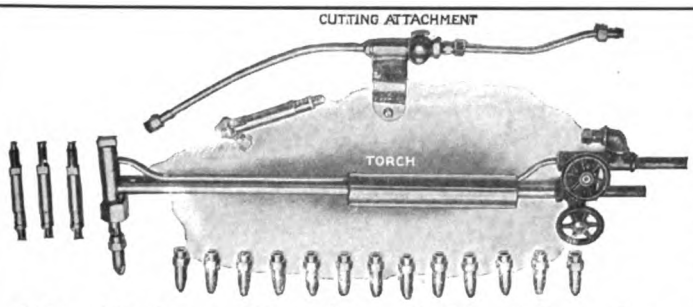

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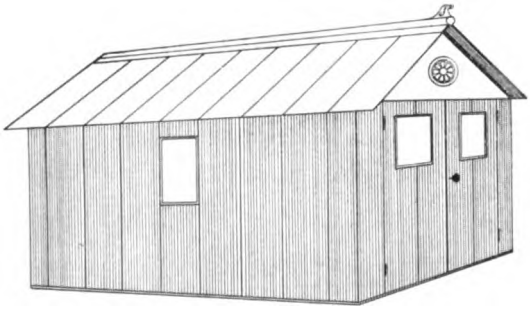

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Garages and Machine Shops

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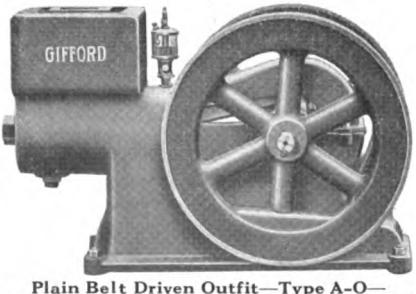

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MACHINES (Continued)

MOTOR DECARBONIZING MACHINES (Continued)

M-E—See Auto Gas Light Co.

MANUFACTURERS Welding Co., Brooklyn, N. Y. "U. O. C."

MESSER & Co., Philadelphia, Pa.

NORFOLK—See Tolman Mfg. Co.

O-SO-EASY—See Bateman Bros.

OXWELD Acetylene Co., Chicago, Ill.

OXY-DECARBONIZER Co., Boston, Mass.

OXYGEN Decarbonizer Co., Albion, Mich.

OXYGEN Generator Co., Troy, N. Y.

OZO Co., Boston, Mass.

PREST-O-LITE Co., 1400 Speedway, Indianapolis, Ind. (See page 515.)

PROGRESSIVE Mfg. Co., Reading, Pa.

RICE & Dayton Mfg. Co., Cedar Falls, Ia.

SANFORD Mfg. Co., F. C., Bridgeport, Conn. (See page 511.)

TOLMAN Mfg. Co., 19-21 W. Third St., Boston, Mass. "Norfolk." (See page 519.)

U. O. C.—See Manufacturers Welding Co.

VULCAN Brazing & Machine Co., 310-12 N. 16th St., Philadelphia, Pa. (See page 521.)

VULITE Chemical Co., Boston, Mass.

NUT TAPPING MACHINES

ACME Machinery Co., Cleveland, O.

AUTOMATIC Machine Co., Bridgeport, Conn.

BROWN Co., H. B., East Hampton, Conn.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Little Giant."

HOWARD Iron Works, Buffalo, N. Y. "Schlenker."

LANDIS Machine Co., Waynesboro, Pa.

LITTLE GIANT—See Greenfield Tap & Die Co.

NATIONAL Machinery Co., Tiffin, O.

NILES-BEMENT-POND Co., New York, N. Y.

PAWTUCKET Mfg. Co., Pawtucket, R. I.

REED Co., Francis, Worcester, Mass.

SCHLENKER—See Howard Iron Works.

WEBSTER & Perks Tool Co., Springfield, O.

WELLS & Son Co., F. E., Greenfield, Mass.

PISTON RING MACHINES

(Semi-Automatic)

GRIDLEY—See Windsor Machine Co.

WINDSOR Machine Co., Windsor, Vt. "Gridley."

POLISHING MACHINES

(See Machines, Buffing and Polishing)

PROFILING MACHINES

BECKER Milling Machine Co., Hyde Park, Mass.

GARVIN Machine Co., New York, N. Y.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

RIVETING MACHINES

CINCINNATI Pulley Machinery Co., Cincinnati, O.

EVELAND Engineering & Mfg. Co., Philadelphia, Pa.

GRANT Mfg. & Machine Co., Bridgeport, Conn.

NILES-BEMENT-POND Co., New York, N. Y.

PAWTUCKET Mfg. Co., Pawtucket, R. I.

SHUSTER Co., F. B., New Haven, Conn.

TOWNSEND Mfg. Co., H. P., Hartford, Conn.

SAND BLAST MACHINES

AMERICAN Diamond Blast Co., New York, N. Y.

BETTON, J. M., New York, N. Y. "Drucklieb."

BUCKEYE—See Macleod Co.

CURTIS & Co., Mfg. Co., St. Louis, Mo.

DANIC—See Nichols Iron Works.

DE LA VERGNE Machine Co., New York, N. Y.

DRUCKLIEB—See Betton, J. M.

MACLEOD Co., Walter, Cincinnati, O. "Buckeye."

NIAGARA Devices, Buffalo, N. Y.

NICHOLS Iron Works, D. M., New York, N. Y. "Danic."

PANGBORN Corp., Hagerstown, Md.

PAXSON Co., J. W., 1019 N. Delaware Ave., Philadelphia, Pa. "Paxson-Warren." (See page 523.)

PAXSON-WARREN—See Paxson Co.

SLY Mfg. Co., W. W., Cleveland, O.

TILGHMAN-BROOKSAND Sand Blast Co., Philadelphia, Pa.

SAW SHARPENING MACHINES

COCHRANE-BLY Co., Rochester, N. Y.

HUNTER Saw & Machine Co., Pittsburg, Pa.

NUTTER & Barnes Co., Hinsdale, N. H.

SCREW MACHINES

(Automatic)

AUTOMATIC Machine Co., Bridgeport, Conn.

BROWN & Sharpe Mfg. Co., Providence, R. I.

CHICAGO Automatic Machine Co., Chicago, Ill.

CLEVELAND Automatic Machine Co., Cleveland, O.

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MACHINES (Continued)

SCREW MACHINES (Continued)

DAVIS Sewing Machine Co., Dayton, O. "Lester."

DAVENPORT Machine Tool Co., New Bedford, Mass.

FOSTER Machine Co., Elkhart, Ind.

GRIDLEY—See Windsor Machine Co.

HARTFORD Machine Screw Co., Hartford, Conn. (See page 301.)

LESTER—See Davis Sewing Machine Co.

NATIONAL-ACME Mfg. Co., Cleveland, O. (See page 395.)

PEERLESS Automatic Machine Co., Cleveland, O.

POTTER & Johnston Machine Co., Pawtucket, R. I.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

TOWNSEND Mfg. Co., H. P., Hartford, Conn.

WINDSOR Machine Co., Windsor, Vt. "Gridley."

SCREW MACHINES

(Hand)

ACME Machine Tool Co., Cincinnati, O.

BARDONS & Oliver, Cleveland, O.

DRESES Machine Tool Co., Cincinnati, O.

FOSTER Machine Co., Elkhart, Ind.

GARVIN Machine Co., New York, N. Y.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

WARNER & Swasey Co., Cleveland, O.

SPRING COILING MACHINES

COULTER & McKenzie Machine Co., Bridgeport, Conn.

GARVIN Machine Co., New York, N. Y.

HOEFER—See Wells Co.

WELLS Co., Frank L., Kenosha, Wis. "Hoefer."

SPRING TESTING MACHINES

COULTER & McKenzie Machine Co., Bridgeport, Conn.

TAPPING MACHINES

BAKER Bros., Toledo, O.

GARVIN Machine Co., New York, N. Y.

HARTFORD Machine Screw Co., Hartford, Conn. (See page 301.)

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

ST. LOUIS Machine Tool Co., St. Louis, Mo.

TIRE BANDAGE WRAPPING MACHINES

MILLER, Chas. E., Anderson, Ind.

ROSSMAN, Roy G., Seattle, Wash.

UPHOLSTERY BUTTON MACHINES

LOUNSBERY & Sons, G. H., Cincinnati, O.

TUFTING Machine Supply Co., 268 Jefferson Ave., E., Detroit, Mich. (See page 505.)

UPHOLSTERY TUFTING MACHINES

BUSER-POSTON Tufting Machine Co., Chillicothe, O.

NOVELTY—See Tufting Machine Supply Co.

TUFTING Machine Supply Co., 268 Jefferson Ave. E., Detroit, Mich. "Novelty." (See page 505.)

VALVE SEATING MACHINES

(For Valve Seating Tools—See Tools, Valve Grinding)

AUTOMATIC Valve-Seating Machinery Co., Sioux City, Ia.

FOOTE-BURT Co., Cleveland, O.

TAYLOR & Fenn Co., Hartford, Conn.

WIRE SPOKE SWAGING MACHINES

LANGELIER Mfg. Co., Providence, R. I.

WOOD BENDING MACHINES

DEFIANCE Machine Works, Defiance, O.

FAY & Egan Co., J. A., Cincinnati, O.

WOOD BORING MACHINES

AJAX Mfg. Co., Pittsburg (N. S.), Pa.

AMERICAN Woodworking Machinery Co., Rochester, N. Y.

BENTEL & Margedant Co., Hamilton, O.

CORDESMAN, Meyer & Co., Cincinnati, O.

CORDESMAN-RECHTIN Co., Cincinnati, O.

DEFIANCE Machine Works, Defiance, O.

FAY & Egan Co., J. A., Cincinnati, O.

GREENLEE Bros. & Co., Rockford, Ill.

JONES Superior Machine Co., Chicago, Ill.

KANE & Roach, Syracuse, N. Y.

OBER Mfg. Co., Chagrin Falls, O.

OLIVER Machinery Co., Grand Rapids, Mich.

POWER & Co., L., Philadelphia, Pa.

PRYIBIL Machine Co., P., New York, N. Y.

SMITH Machine Co., H. B., Smithville, N. J.

VALLEY City Machine Works, Grand Rapids, Mich.

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WHITTELSEY-FORD CARBURETER ADJUSTER

an adjustable dash carbureter adjuster for Ford Cars. Easily attached, easily handled, an indispensable help to every Ford. Removes the guessing and enables quick, positive carbureter adjustment by any Ford owner. Makes starting easier, running better and

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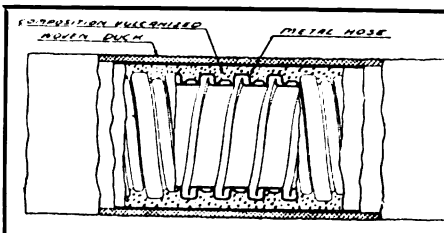

"Triplexd" Hose for Gasoline

"Triplexd" is a specially reinforced and very flexible metal hose.

"Triplexd" is as flexible as rubber hose and is stronger and more lasting than plain metal hose. In other words it possesses all the good qualities of both rubber and metal hose and at the same time eliminates the several faults to be found in their use.

Complete description together with prices will be sent upon request.

"Triplexd" is the hose you can afford to use.

Manufactured by

METAL HOSE & TUBING CO.
17 BATTERY PLACE,
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CRANK SHAFTS
and
SPECIAL FORGINGS
of all kinds

Drop Forged or hammered from Billet, Alloy or Carbon Steels. Smooth forged or finished to size.

SEND IN YOUR ORDERS.

Obenberger Drop Forge Co.
Milwaukee Wisconsin
Plant at Cudahy

"Sure Fit" Covers

The serviceable kind you see on Fifth Avenue, the choice of fastidious New York motorists. When you buy seat covers be sure you get **both** essential qualities: looks and wear. Seat covers with a thin, sleazy surface cloth over rubber composition have the looks all right—for a while. But how do they look when they get a bit rubbed and never can be cleaned?

Seat Covers of Burbank Cloths

keep their looks because they **wear.** The goods is one solid fabric from face to back, with the wear distributed all through every shred. They are as strong for their service and as integral as any other part of a good car. Can be CLEANED with Gasolene or soap and water.

BURBANK CLOTHS come in various colors and **cost no more** than ordinary materials.

Ask for samples and prices.

Phillips Auto Seat Cover Co.
Manufacturers of
"SURE-FIT" SEAT COVERS
244-250 West 49th St., New York

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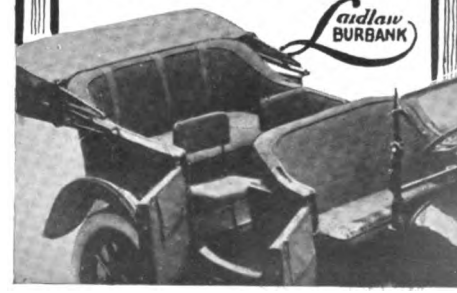

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MACHINES (Continued)

WOOD MORTISING AND TENONING MACHINES

AMERICAN Woodworking Machinery Co., Rochester, N. Y.

CORDESMAN-RECHTIN Co., Cincinnati, O.

DEFIANCE Machine Works, Defiance, O.

FAY & Egan Co., J. A., Cincinnati, O.

GREENLEE Bros. & Co., Rockford, Ill.

OLIVER Machinery Co., Grand Rapids, Mich.

MALLETS

WOODEN MALLETS

BLISS Mfg. Co., R., Pawtucket, R. I.

DELPHOS Mfg. Co., Delphos, O.

HELLENBERG Co., J. B., Coldwater, Mich.

PIQUA Handle & Mfg. Co., Piqua, O.

SANDUSKY Tool Co., Sandusky, O.

UNION Hardware Co., Torrington, Conn.

MANDRELS

EXPANDING MANDRELS

CHAMPION—See Western Tool & Mfg. Co.

LE COUNT, Wm. G., South Norwalk, Conn.

McCROSKY Reamer Co., Meadville, Pa.

MORSE Twist Drill & Machine Co., New Bedford, Mass.

NICHOLSON & Co., W. H., Wilkes-Barre, Pa.

WESTERN Tool & Mfg. Co., Springfield, O. "Champion."

METERS

CUT METERS

AMERICAN Ever Ready Co., New York, N. Y. "Ever Ready."

EVER READY—See American Ever Ready Co.

STEWART-WARNER Speedometer Corp., 1904 Diversey Blvd., Chicago, Ill. "Warner."
(See page 555.)

WARNER—See Stewart-Warner Speedometer Corp.

GASOLINE OR OIL METERS

BOWSER & Co., S. F., Fort Wayne, Ind.

BUFFALO Meter Co., Buffalo, N. Y. "Niagara."

HYDRAULIC Oil Storage & Engineering Co., New York, N. Y.

NEPTUNE Meter Co., New York, N. Y. "Trident."

NIAGARA—See Buffalo Meter Co.

TRIDENT—See Neptune Meter Co.

MICROMETERS

MICROMETER CALIPERS

BROWN & Sharpe Mfg. Co., Providence, R. I.

COLUMBIA—See Smith, E. G.

GOODELL-PRATT Co., Greenfield, Mass.

REED & Prince Mfg. Co., Worcester, Mass.

SLOCOMB Co., J. T., Providence, R. I.

SMITH, E. G., Columbia, Pa. "Columbia."

STARRETT Co., L. S., Athol, Mass.

MOLDS

SOFT HAMMER MOLDS

HORAT, J., Lafayette, Ind.

TIRE VULCANIZING MOLDS AND CORES

BRIDGEWATER Machine Co., Akron, O.

MILLER, Chas. E., Anderson, Ind.

MILWAUKEE Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis.
(See page 449.)

WILLIAMS Foundry & Machine Co., Akron, O.

OVENS

CORE BAKING OVENS

BLODGETT Co., G. S., Burlington, Vt.

CALUMET Foundry Equipment Co., Harvey, Ill.

FOUNDRY Equipment Co., Buffalo, N. Y.

GOETZ Co., Chicago, Ill.

HILL & Griffith Co., Cincinnati, O.

MILLETT Core Oven Co., Springfield, Mass.

MONARCH Engineering & Mfg. Co., Baltimore, Md.

OVEN Equipment & Mfg. Co., New Haven, Conn.

ROCKWELL Co., W. S., New York, N. Y.

WADSWORTH Core Machine & Equipment Co., Akron, O.

WHITING Foundry Equipment Co., Harvey, Ill

ENAMELING OVENS

AMERICAN Enamel Co., Providence, R. I. "Mascot."

CULLEN-ATKINSON Co., Hartford, Conn.

MASCOT—See American Enamel Co.

MONARCH Engineering & Mfg. Co., Baltimore, Md.

NEIL & Co., Wm., Chicago, Ill.

OVEN Equipment & Mfg. Co., New Haven Conn.

ROCKWELL Co., W. S., New York, N. Y.

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MANUFACTURER OF

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FACING MILLS
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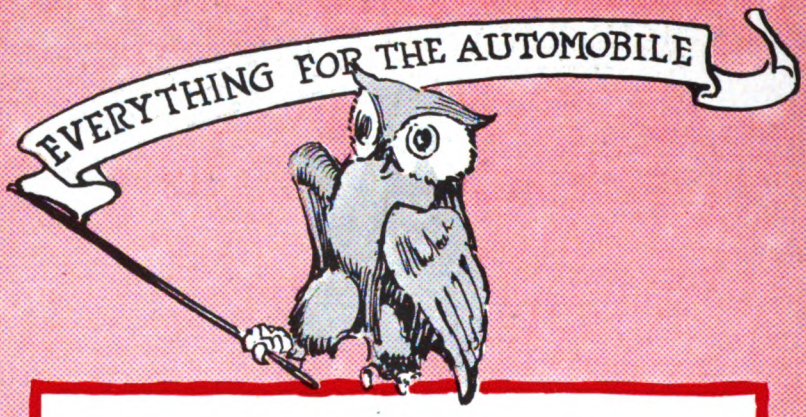

Now and Then

If an automobile factory has already filled the want, through evolution, by building its own Foundry and its own Electro-Plating Plant, I want to interest the Executive for that factory NOW.

I operate a reduction mill and from it comes silk-bolted plumbago, black lead, talc, flake plumbago and foundry facings of the various kinds.

I manufacture Buffing Compositions in another factory, buffing wheels and all the necessaries for an Electro-Plating Plant.

If the addition of facilities for making Castings, and for plating them, is in contemplation—if the Foundry and the Plating Plant is to be added—THEN I want to submit Equipment Bulletins, quotations, etc.

This is not a new enterprise; it has gained from long experience the necessary and the efficient knowledge to give good service.

If you will write to me we will start a correspondence school and I will try to make it interesting.

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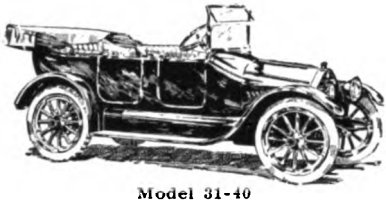
"The Little Aristocrat"



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Electric Lighting and Starting

Touring car or Roadster body on sturdiest light car chassis on market. Motor 3¾ x 4½, extra heavy Weston-Mott rear axle, and three speed forward transmission, disc clutch, Remy electric starting, lighting and ignition, Holley carburetor, Warner steering gear, right side steering, center control, thermosyphon cooling, constant level and force feed lubrication, Artillery wheels, 32 x 3½" tires. Non-skid on rear. Standard equipment includes top and top boot, windshield, Stewart speedometer, Demountable rims, spare tire carrier, horn, tools, inspection lamp, etc.

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This Car Answers Your Question—

"What Car Shall I Hook Up With Permanently?"

Cole dealers stick to Cole. This is significant. The men who handled the first Coles are **still handling Cole.** The line includes:

Cole Standard Four	**$1485**
Cole Standard Six	**1685**
Cole Sensible Six	**1865**
Cole Big Six	**2465**

All touring bodies are full seven-passenger; the Standard Four and Six carry bodies with the **divided front seat** and **one man top.**

Confidential information to rated dealers on request.

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Indianapolis, U. S. A.
Builders of the Standardized Car

CHANDLER

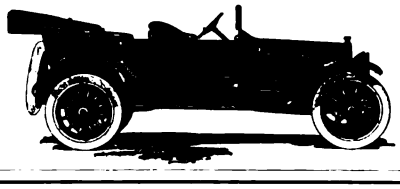
LIGHT WEIGHT SIX—1915

$1595

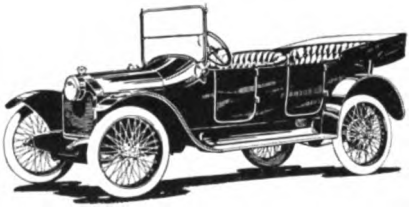
IT weighs 2885 pounds completely equipped—ON THE SCALES. It runs 16 miles per gallon gasoline. It runs 700 miles per gallon oil. Owners average 7000 miles per set tires. And it possesses every high grade feature found on high priced sixes. Speed 3 to 55 miles an hour without shifting gears. Climbs every hill between Boston and Chicago on high. Rides the bumps like a boat.

And for 1915—ten per cent more power and many added refinements—at the new profit-sharing price, $1595.

CHANDLER MOTOR CAR CO.
CLEVELAND, OHIO



BRISCOE



First French Car at an $785 American Price

Completely equipped with high-tension magneto, electric starter, light generator, one-man top, wind shield, speedometer, etc.

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PAPER

EMERY AND SAND PAPER

AMERICAN Glue Co., Boston, Mass. "Union," "New England," "Boston."

ARMOUR & Co., Chicago, Ill.

BAEDER, Adamson & Co., New York, N. Y.

BARTON & Son Co., H. H., Philadelphia, Pa.

BEHR & Co., Herman, New York, N. Y. "Brooklyn."

BOSTON—See American Glue Co.

BROOKLYN—See Behr & Co.

CARBORUNDUM Co., Niagara Falls, N. Y.

MANNING Sand Paper Co., Waterliet, N. Y.

MINNESOTA Lining & Mfg. Co., St. Paul, Minn.

NEW ENGLAND—See American Glue Co.

UNION—See American Glue Co.

U. S. Sand Paper Co., Williamsport, Pa.

WAUSAU Abrasives Co., Wausau, Wis.

PLANERS

METAL PLANERS

AMERICAN Tool Works Co., Cincinnati, O.

BARTLETT, Edwin E., Boston, Mass. "Federal."

CHANDLER Planer Co., Ayer, Mass.

CINCINNATI Planer Co., Cincinnati, O.

CINCINNATI Shaper Co., Cincinnati, O.

FEDERAL—See Bartlett, Edwin E.

GRAY Co., G. A. Cincinnati, O.

HAMILTON Machine Tool Co., Hamilton, O.

KNECHT Planer Co., Cincinnati, O.

NILES-BEMENT-POND Co., New York, N. Y.

OHIO Machine Tool Co., Kenton, O.

POWELL Machine Co., Fitchburg, Mass.

PUTNAM Machine Co., Fitchburg, Mass.

ROCKFORD Machine Tool Co., Rockford, Ill.

STAPF & Co., John B., Dunkirk, N. Y.

WHITCOMB-BLAISDELL Machine Tool Co., Worcester, Mass.

WOODWARD & Powell Planer Co., Worcester, Mass.

WOOD PLANERS

AMERICAN Woodworking Machinery Co., Rochester, N. Y.

BENTEL & Margedant Co., Hamilton, O.

BERLIN Machine Works, Beloit, Wis.

CONNELL & Dengler Machine Co., Rochester, N. Y.

CORDESMAN, Meyer & Co., Cincinnati, O.

CORDESMAN-RECHTIN Co., Cincinnati, O.

CRESCENT Machine Co., Leetonia, O.

DEFIANCE Machine Works, Defiance, O.

FALLS Machine Co., Sheboygan Falls, Wis.

FAY & Egan Co., J. A., Cincinnati, O.

GREAVES-KLUSMAN Tool Co., Cincinnati, O.

GREENLEE Bros. & Co., Rockford, Ill.

HALL & Brown Woodworking Machine Co., St. Louis, Mo.

JONES Superior Machine Co., Chicago, Ill.

KANE & Roach, Syracuse, N. Y.

OLIVER Machinery Co., Grand Rapids, Mich.

PORTER Machinery Co., C. O., Grand Rapids, Mich.

POWER & Co., L., Philadelphia, Pa.

PRYIBIL Machine Co., P., New York, N. Y.

SCHNEIDER & Goosman Machine Co., Cincinnati, O.

SMITH Machine Co., H. B., Smithville, N. J.

VALLEY City Machine Works, Grand Rapids, Mich.

WHITNEY & Son, Baxter D., Winchendon, Mass.

PLANES

WOODWORKERS PLANES

BAILEY—See Stanley Rule & Level Co.

BEDROCK—See Stanley Rule & Level Co.

CHAPIN-STEVENS Co., Pine Meadow, Conn.

GAGE Tool Co., Vineland, N. J.

MACK & Co., Rochester, N. Y.

OHIO Tool Co., Charleston, W. Va.

SANDUSKY Tool Co., Sandusky, O.

SARGENT & Co., New Haven, Conn.

STANLEY Rule & Level Co., New Britain, Conn. "Bailey," "Bedrock."

PLATES

FOUNDRY RAPPING PLATES

ACME—See Everett & Son.

BENSKIN Mfg. Co., Canton, O. "Perfect."

CLEVELAND Galvanizing Works Co., Cleveland, O.

DIAMOND Clamp & Flask Co., Richmond, Ind.

EVERETT & Son, A., Auburn, N. Y. "Acme." "Fraser."

FRASER—See Everett & Son.

HILL & Griffith Co., Cincinnati, O.

OLIVER Machinery Co., Grand Rapids, Mich.

PAXSON Co., J. W., 1019 N. Delaware Ave., Philadelphia, Pa. (See page 523.)

PERFECT—See Benskin Mfg. Co.

SHANAFELT Mfg. Co., Canton, O.

TIMMIS & Clissold, Bound Brook, N. J.

SCREW PLATES

(See Taps and Dies)

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can be installed in less than twenty minutes on any car equipped with starting or lighting system. Consumes very little current—the surplus generated by a Ford Magneto is ample for the Ford Warm Hand Wheel.

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SPECIAL SYSTEM FOR FORD CARS.

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PLIERS

COMBINATION PLIERS

ATHOL Machine Co., Athol, Mass.

BARCALO Mfg. Co., Buffalo, N. Y. **(See page 563.)**

BERGMAN Tool Mfg. Co., Buffalo, N. Y.

BERNARD—See Scholhorn Co.

BILLINGS & Spencer Co., Hartford, Conn. "Hayden."

BONNER Tool Co., Champaign, Ill. "Victor."

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BUFFUM Tool Co., Louisiana, Mo.

CINCINNATI Tool Co., Norwood, O. "Hargrave."

CRESCENT Tool Co., Jamestown, N. Y. "Simplex." **(See page 559.)**

CRONK & Carrier Mfg. Co., Elmira, N. Y.

CURRIER-KOETH Mfg. Co., Coudersport, Pa. "K. I. T."

DANIELSON & Co., J. P., Jamestown, N. Y.

DUDLY Tool Co., Menominee, Mich.

ERIE Tool Works, Erie, Pa.

HARGRAVE—See Cincinnati Tool Co.

HAYDEN—See Billings & Spencer Co.

HERBRAND Co., Fremont, O.

HJORTH & Co., Wm., Jamestown, N. Y.

IRVINGTON Mfg. Co., Irvington, N. J. "Red Devil."

K. I. T.—See Currier-Koeth Mfg. Co.

KILBORN & Bishop Co., New Haven, Conn.

KRAEUTER & Co., Newark, N. J.

McKAIG Drop Forge Co., Buffalo, N. Y.

MOSSBERG Co., Frank, Attleboro, Mass. **(See page 561.)**

OSWEGO Tool Co., Oswego, N. Y.

PECK, Stow & Wilcox Co., Southington, Conn.

RED DEVIL—See Irvington Mfg. Co.

REDD Mfg. Co., Erie, Pa.

S. & I. Co., Springfield, Mass.

SCHOLHORN Co., Wm., New Haven, Conn. "Bernard."

SHARK—See Wakefield Mfg. Co.

SIMPLEX—See Crescent Tool Co.

STARRETT Co., L. S., Athol, Mass.

VICTOR—See Bonner Tool Co.

VLCHEK Tool Co., Cleveland, O.

WAKEFIELD Mfg. Co., Wakefield, Neb. "Shark."

WEST Haven Mfg. Co., New Haven, Conn.

WORDEN, E. M., Ladysmith, Wis.

WRIGHT Wrench & Forging Co., Canton, O.

GAS PLIERS

(See Pliers, Combination)

ELECTRIC PORTABLE POLISHERS

(See Drills, Electric Portable)

POSTS

TOOL POSTS

ARMSTRONG Bros. Tool Co., 304 N. Francisco Ave., Chicago, Ill. **(See page 541.)**

O. K. Tool Holder Co., Shelton, Conn.

PRESSES

ARBOR PRESSES

BARNES Co., W. F. & John, Rockford, Ill.

BARTLETT, Edwin E., Boston, Mass. "Greenerd."

CLEVELAND Machine Specialty Co., Cleveland, O.

D. P.—See Pruyn Co.

GEIER Co., P. A., Cleveland, O.

GREENERD—See Bartlett, Edwin E.

LEWISTON Motors, Lewiston, Me. "Whitney"

LOURIE Mfg. Co., Springfield, Ill.

LUCAS Macine Tool Co., Cleveland, O.

NILES-BEMENT-POND Co., New York, N. Y.

POST Garage & Repair Shop, Amos, Catskill, N. Y.

PRUYN Co., David H., 1876 Broadway, New York, N. Y. "D. P." **(See page 507.)**

WEAVER Mfg. Co., Springfield, Ill.

WHITNEY—See Lewiston Motors.

WILMARTH & Morman Co., Grand Rapids, Mich.

BENCH STRAIGHTENING PRESSES

CLEVELAND Machine Specialty Co., Cleveland, O.

COREY—See Steel Specialties Co.

GEIER Co., P. A., Cleveland, O.

SPRINGFIELD Machine Tool Co., Springfield, O.

STEEL Specialties Co., Boston, Mass. "Corey."

BROACHING PRESSES

BLISS Co., E. W., Brooklyn, N. Y.

BURR & Sons, J. T., Brooklyn, N. Y.

CONSOLIDATED Press & Tool Co., Hasting, Mich. **(See page 533.)**

LAPOINTE Co., J. N., New London, Conn.

LAPOINTE Machine Tool Co., Hudson, Mass.

PERKINS Machine Co., Warren, Mass.

STANDARD Machinery Co., Auburn, R. I. **(See page 443.)**

WATSON-STILLMAN Co., New York, N. Y.

POWER PRESSES

ADRIANCE Machine Works, Brooklyn, N. Y.

AMS Machine Co., Max, Mt. Vernon, N. Y.

ATLAS Machine Co., Waterbury, Conn.

BAIRD Machine Co., Bridgeport, Conn.

BLISS Co., E. W., Brooklyn, N. Y.

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All standard sizes carried in stock for immediate shipment. You will be interested in our new catalog, and we shall be glad to mail a copy upon receipt of request.

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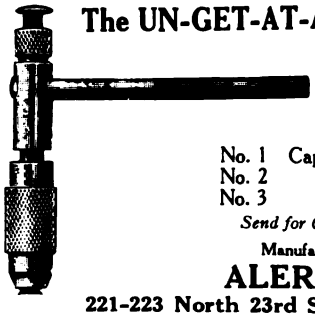

The UN-GET-AT-ABLE Gotten! Instantaneously, too!

by the **Alert Ratchet Tap Wrench,** whether Right or Left Hand Tapping, in corners or out-of-the-way places.

Three Sizes:

No. 1	Capacity	1-16"	3-16"	$1.25
No. 2	"	1-8"	1-4"	1.25
No. 3	"	3-16"	7-16"	1.50

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FROM STOCK, OR MADE SPECIAL
FROM BLUE PRINT OR MODEL

Our experience is your guarantee of satisfactory service.

We are specialists in the grinding and finishing of crank shafts. We have a thoroughly equipped shop with the latest automatic machinery. Our men are skilled workmen, the equal of any, anywhere in the country. *Put your crank shaft problems up to us*

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Saginaw, Michigan

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PRESSES (Continued)

POWER PRESSES (Continued)

BRISTOL—See Garrigus Machine Co.

CADY Machine Co., Cleveland, O.

CLEVELAND Punch & Shear Works Co., Cleveland, O.

CONSOLIDATED Press & Tool Co., Hastings, Mich. (See page 533.)

COULTER & McKenzie Machine Co., Bridgeport, Conn.

FERRACUTE Machine Co., Bridgeton, N. J.

GARRIGUS Machine Co., C. G., Bristol, Conn. "Bristol."

HIBBARD Mfg. Co., Wm. H., Brooklyn, N. Y.

LA SALLE Machine & Tool Co., La Salle, Ill.

LEFFLER & Co., Chas., Brooklyn, N. Y.

MANVILLE Machine Co., E. J., Waterbury, Conn.

MASSILLON Foundry & Machine Co., Massillon, O.

MICHIGAN Press Co., Ypsilanti, Mich.

NIAGARA Machine & Tool Works, Buffalo, N. Y.

NILES-BEMENT-POND Co., New York, N. Y.

PERKINS Machine Co., Warren, Mass.

ROCKFORD Iron Works, Rockford, Ill.

SPRINGFIELD Machine Tool Co., Springfield, O.

STANDARD Machinery Co., Auburn, R. I. (See page 443.)

STOLL Co., D. H., Buffalo, N. Y.

SWAINE Mfg. Co., Fred J., St. Louis, Mo.

TOLEDO Machine & Tool Co., Toledo, O.

V. & O. Press Co., Brooklyn, N. Y.

WATERBURY Farrell Foundry & Machine Co., Waterbury, Conn.

WILLARD Machine & Tool Co., Cincinnati, O.

ZEH & Hahnemann Co., Newark, N. J.

PULLERS

COTTER PIN PULLERS

BONNER Tool Co., Champaign, Ill. "Victor."

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BUFFUM Tool Co., Louisiana, Mo.

CARVER Tool Works, Spring Valley, N. Y.

KRAEUTER & Co., Newark, N. J.

MARCY Tool Works, Putnam, Conn.

MOSSBERG Co., Frank, Attleboro, Mass. (See page 561.)

MOUND Tool Co., Seventh & Hickory Sts., St. Louis, Mo. (See page 475.)

NELSON Mfg. Co., A., Chicago, Ill.

NOONAN Tool & Machine Works, A. S., Rome, N. Y.

S. & I. Co., Springfield, Mass.

VAUGHAN & Bushnell Mfg. Co., Chicago, Ill.

VICTOR—See Bonner Tool Co.

VLCHEK Tool Co., Cleveland, O.

WORDEN, E. M., Ladysmith, Wis.

GEAR AND WHEEL PULLERS

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

COLLISON'S Garage, Burlington, Vt.

CRANE Puller Co., Arlington, Mass.

KERSCHBAUM, M. E., New York, N. Y.

LITTLE GIANT—See Premier Electric Co.

POLSON Mfg. Co., Buffalo, N. Y.

PREMIER Electric Co., Chicago, Ill. "Little Giant."

SCHWEPPE & Wilt Mfg. Co., Detroit, Mich.

PUMPS

GARAGE PUMPS AND AIR COMPRESSORS

A. B. C.—See Artizan Brass Co.

ACME Machine Works, Findlay, O.

ALDING—See Cast Iron Brazing & Mfg. Co.

ALLIS-CHALMERS Mfg. Co., Milwaukee, Wis.

AMERICAN Air Compressor Co., Detroit, Mich.

AMERICAN Electric Air Pump Co., 200 Barbeau St, Pittsburg, Pa. (See page 535.)

AMERICAN Steam Pump Co., Battle Creek, Mich.

APEX Electric Mfg. Co., Chicago, Ill.

ARTIZAN Brass Co., Chicago, Ill. "A. B. C."

AU-TO Compressor Co., Wilmington, O.

AUTO Air-Rotor Co., Auburn, N. Y.

BESSEMER Gas Engine Co., Grove City, Pa.

BINKS—See Star Brass Works.

BISHOP-BABCOCK-BECKER Co., Cleveland, O. "Eureka."

BLAISDELL Machine Co., Bradford, Pa.

BROWN Beer Pump Co., E. R., Boston, Mass. "Success."

BRUNNER Mfg. Co., Utica, N. Y. (See page 537.)

CALDWELL & Co., H. S., New York, N. Y.

CAST Iron Brazing & Mfg. Co., Manchester, N. H. "Alding."

CHAMPION—See Cleveland Faucet Co.

CHICAGO Pneumatic Tool Co., Chicago, Ill.

CHRISTENSEN Engineering Co., Milwaukee, Wis.

CLAYTON—See International Steam Pump Co.

CLEVELAND Faucet Co., Cleveland, O. "Champion."

COMSTOCK, A. S., Evanston, Ill.

CURTIS & Co., Mfg. Co., St. Louis, Mo.

CYCLONE—See Judd & Leland Mfg. Co.

DEAD EASY—See Globe Mfg. Co.

EUREKA—See Bishop-Babcock-Becker Co.

EUREKA—See Loppacker, Albert.

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Portable and Stationary Garage Auto Tire Pumps

For Public and Private Garages

Will fully inflate the largest tires rapidly

Expensive installation of piping and tanks for storage of air entirely eliminated.

Turn a switch and you have a continuous supply of air to fully inflate tire without a stop.

A rotary compressor without valves or packing rings.

Equipped with a positive operating splash oiling system in a dust proof case.

Direct connected to Motor with Flexible Coupling. No Gears.

It has that durability which is not known in any other pump.

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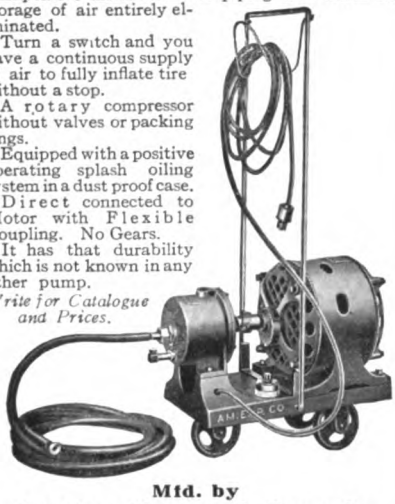

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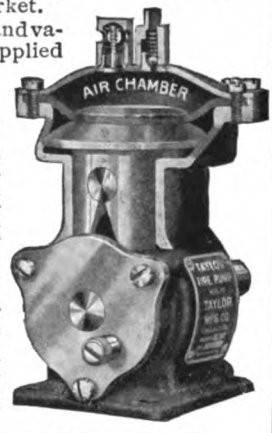
Excludes all oil and vapor from tube—applied in a jiffy.



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The Taylor Tire Pump is used as standard equipment on following cars: Packard, Cole, Oakland, Oldsmobile, Marmon, Moon, Moyer, Palmer-Singer, Premier and Velie.

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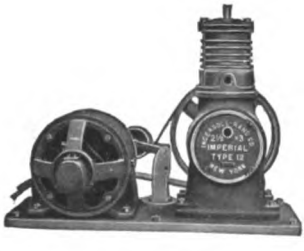

The vital questions of maintenance, durability and smooth operation of an air compressor are really questions of ample bearings and wearing surfaces and lubrication efficiency. Their importance cannot be exaggerated.

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PUMPS (Continued)

GARAGE PUMPS AND AIR COMPRESSORS (Continued)

FAIRBANKS, Morse & Co., Chicago, Ill.

FORT Wayne Engineering & Mfg. Co., Fort Wayne, Ind. "Paul."

GARDNER Governor Co., Quincy, Ill.

GEMMER-DETROIT Starter Co., Detroit, Mich.

GENERAL Electric Co., Schenectady, N. Y.

GENERAL Utility Co., Philadelphia, Pa.

GIFFORD Engine Co., Lansing, Mich. (See page 521.)

GLEASON-PETERS Air Pump Co., Brooklyn, N. Y.

GLOBE Mfg. Co., Battle Creek, Mich. "Dead Easy."

GREEN & Swett Co., Boston, Mass. "Tri-Phoon."

GOULDS Mfg. Co., Seneca Falls, N. Y.

HALE Electric & Engineering Co., Cleveland, O. (See page 465.)

HARTFORD Machine Screw Co., Hartford, Conn. "Master." (See page 301.)

HAYWARD Tire & Equipment Co., Indianapolis, Ind.

HERZ & Co., 245 W. 55th St., New York, N. Y. "Minimax." (See page 311.)

IMPERIAL—See Ingersoll-Rand Co.

INGERSOLL-RAND Co., 11 Broadway, New York, N. Y. "Imperial." (See page 535.)

INTERNATIONAL Steam Pump Co., New York, N. Y. "Clayton."

JACOBSON Machine Mfg. Co., Warren, Pa. (See page 345.)

JUDD & Leland Mfg. Co., Clifton Springs, N. Y. "Cyclone," "Juleco." (See pages 205 and 479.)

JULECO—See Judd & Leland Mfg. Co.

KELLOGG Mfg. Co., Rochester, N. Y. (See page 325.)

LIPMAN Air Appliance Co., Beloit, Wis.

LITTLE GIANT—See Orange Machine & Mfg. Co.

LOPPACKER, Albert, Bloomfield, N. J. "Eureka."

MASTER—See Hartford Machine Screw Co.,

MAYO Mfg. Co., 58 E. 18th St., Chicago, Ill. (See page 325.)

MINIMAX—See Herz & Co.

NAGLE Corliss Engine Works, Erie, Pa.

NATIONAL Brake & Electric Co., Milwaukee, Wis.

O. B.—See Universal Mfg. Co.

ORANGE Machine & Mfg. Co., Orange, N. J. "Little Giant."

OWEN Air Compressor Works, N. E., Springfield, O.

PAUL—See Fort Wayne Engineering & Mfg. Co.

PEERLESS Accessories Manufacturers, Chicago, Ill.

POWER Mfg. Co., Lima, O.

ROHRBACHER Automatic Air Pump Co., Portland, Ore.

SARGENT Steam Meter Co., Chicago, Ill.

SPACKE Machine Co., F. W., Indianapolis, Ind. (See page 253.)

SPICER Mfg. Co., Groton, Conn.

STAR Brass Works, Chicago, Ill. "Binks."

SUCCESS—See Brown Beer Pump Co.

SUPERIOR Machine & Engineering Co., Detroit, Mich. "Yale."

TOPPING Bros., New York, N. Y.

TRI-PHOON—See Green & Swett Co.

UNION Steam Pump Co., Battle Creek, Mich.

UNITED States Electrical Tool Co., Cincinnati, O. (See page 487.)

UNIVERSAL Mfg. Co., Minneapolis, Minn. "O. B."

VICTOR Electric Co., Chicago, Ill.

WESTINGHOUSE Air Brake Co., Pittsburg, Pa.

YALE—See Superior Machine & Engineering Co.

PUNCHES

PUNCHES AND SHEARS

BADGER State Machine Co., Janesville, Wis.

BERTSCH & Co., Cambridge City, Ind.

BICKNELL Mfg. & Supply Co., Janesville, Wis.

BLISS Co., E. W., Brooklyn, N. Y.

BUFFALO Forge Co., Buffalo, N. Y.

CANEDY-OTTO Mfg. Co., Chicago Heights, Ill.

CHAMPION Blower & Forge Co., Lancaster, Pa.

CLARK Foundry Co., Rumford, Me.

CLEVELAND Punch & Shear Works Co., Cleveland, O.

CLOUGH, R. M., Tolland, Conn

EXCELSIOR Tool & Machine Co., East St. Louis, Ill. "X L C R."

FERRACUTE Machine Co., Bridgeton, N. J.

HUNTINGTON Machine & Foundry Co., Huntington, Ind.

KANE & Roach, Syracuse, N. Y.

LITTLE Giant Punch & Shear Co., Sparta, Ill.

LONG & Allstatter Co., Hamilton, O.

MASSILLON Foundry & Machine Co., Massillon, O.

MITTS & Merrill, Saginaw, Mich.

MOLINE—See Williams, White & Co.

NEW Doty Mfg. Co., Janesville, Wis.

NIAGARA Machine & Tool Works, Buffalo, N. Y.

NILES-BEMENT-POND Co., New York, N. Y.

PECK, Stow & Wilcox Co., Southington, Conn.

PELS & Co., Henry, New York, N. Y.

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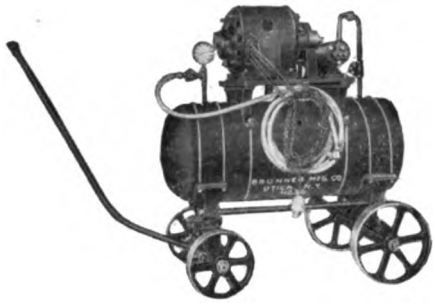

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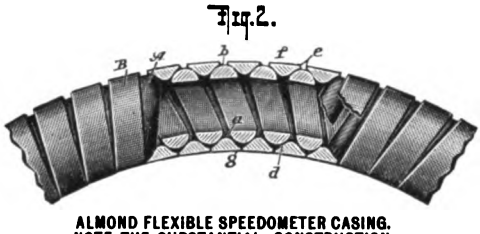

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"Laidlaw Storm King" Top Coverings
"Laidlaw" Leather Fabrics
"Laidlaw" English Mohairs
"Laidlaw" Mackintosh Cloths
"Laidlaw" Limousine Linings
"Laidlaw" Limousine Silks
"Laidlaw" Limousine Linens
"Laidlaw" Automobile Carpets
"Laidlaw" English Horsehair Carpets

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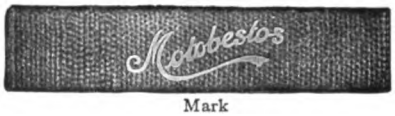

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PUNCHES AND SHEARS (Continued)

PERKINS Machine Co., Warren, Mass.

QUICKWORK—See Smith, H. Collier.

ROBINSON Mfg. Co., J. M., Cincinnati, O.

ROCK River Machine Co., Janesville, Wis.

ROYERSFORD Foundry & Machine Co., Royersford, Pa.

SCHATZ Mfg. Co., Poughkeepsie, N. Y.

SMITH, H. Collier, Detroit, Mich. "Quickwork."

STOLL Co., D. H., Buffalo, N. Y.

TOLEDO Machine & Tool Co., Toledo, O.

UNION Mfg. Co., New Britain, Conn.

WHITCOMB-BLAISDELL Machine Tool Co., Worcester, Mass.

WHITING Co., Geo., Chicago, Ill.

WILLIAMS, White & Co., Moline, Ill. "Moline."

X L C R—See Excelsior Tool & Machine Co.

ARCH AND WASHER PUNCHES

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

JOHNSON, Wm., Newark, N. J.

KRAEUTER & Co., Newark, N. J.

CENTER AND PRICK PUNCHES

BEALL Bros., Alton, Ill.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BROWN & Sharpe Mfg. Co., Providence, R. I.

BROWNE & Dowd Mfg. Co., Meriden, Conn.

BUFFUM Tool Co., Louisiana, Mo.

CARVER Tool Works, Spring Valley, N. Y.

CINCINNATI Tool Co., Norwood O., "Hargrave."

CRONK & Carrier Mfg. Co., Elmira, N. Y.

DEUSE, J. S., Chester, Conn.

EASY HOLD—See West Haven Mfg. Co.

EVANSVILLE Tool Works, Evansville, Ind.

GOODELL-PRATT Co., Greenfield, Mass.

HARGRAVE—See Cincinnati Tool Co.

JOHNSON, Wm., Newark, N. J.

KRAEUTER & Co., Newark, N. J.

LOWENTRAUT Mfg. Co., P., Newark, N. J.

MARCY Tool Works, Putnam, Conn.

MAYHEW Co., H. H., Shelburne Falls, Mass.

O. K.—See West Haven Mfg. Co.

PECK, Stow & Wilcox Co., Southington, Conn.

S. & I. Co., Springfield, Mass.

STARRETT Co., L. S., Athol, Mass.

STORTZ & Son, John, Philadelphia, Pa.

SYRACUSE Twist Drill Co., Syracuse, N. Y.

TUCK Mfg. Co., Brockton, Mass.

WEST Haven Mfg. Co., New Haven, Conn. "O. K.," "Easy Hold."

PORTABLE HAND PUNCHES

ARMSTRONG-BLUM Mfg. Co., Chicago, Ill. "Marvel."

BUFFALO Forge Co., Buffalo, N. Y.

CLOUGH, R. M., Tolland, Conn.

EVANSVILLE Tool Works, Evansville, Ind.

EXCELSIOR Tool & Machine Co., East St. Louis, Ill. "Little Giant."

HUNTINGTON Machine & Foundry Co., Huntington, Ind.

KIDDER Mfg. Co., J. F., Burlington, Vt.

LITTLE GIANT—See Excelsior Tool & Machine Co.

LITTLE Giant Punch & Shear Co., Sparta, Ill.

MARVEL—See Armstrong-Blum Mfg. Co.

PELS & Co., Henry, New York, N. Y.

SCHATZ Mfg. Co., Poughkeepsie, N. Y.

PRICK PUNCHES

(See Punches, Center and Prick)

WASHER PUNCHES

(See Punches, Arch and Washer)

PYROMETERS

ADVANCE—See Wilson-Maeulen Co.

BRISTOL Co., Waterbury, Conn.

BROWN Instrument Co., Philadelphia, Pa.

DU Vivier, Ernest H., New York, N. Y. (Importer.)

ESTERLINE Co., Indianapolis, Ind.

HANOVIA Chemical & Mfg. Co., Newark, N.J.

HOSKINS Mfg. Co., Detroit, Mich.

LE CHATELIER—See Wilson-Maeulen Co.

LEEDS & Northrup Co., Philadelphia, Pa.

PYROSCOPE—See Shore Instrument & Mfg. Co.

QUEEN-GRAY Co., Philadelphia, Pa.

SCHAEFFER & Budenberg Mfg. Co., Brooklyn, N. Y.

SHORE Instrument & Mfg. Co., New York, N. Y. "Pyroscope."

STUPAKOFF Laboratories, Pittsburg, Pa.

TAYLOR Instrument Cos., Rochester, N. Y. "Tycos."

THWING Instrument Co., Philadelphia, Pa.

TYCOS—See Taylor Instrument Cos.

UNIPIVOT—See Wilson-Maeulen Co.

WILSON-MAEULEN Co., New York, N. Y. "Advance," "Le Chatelier," "Unipivot."

ZAUBITZ, August, New York, N. Y.

RACKS

DRILL RACKS

DRIVER, C. H., Racine, Wis.

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CLARK Co., W. J., Salem, O.

CLEVELAND Wire Spring Co., Cleveland, O.

DARBY & Sons Co., Edward, Philadelphia, Pa.

DURAND-STEEL Locker Co., Chicago, Ill.

FEDERAL Steel Fixture Co., Chicago, Ill.

HETTS Co., Detroit, Mich.

LYON Metallic Mfg. Co., Aurora, Ill.

MANUFACTURING, Equipment & Engineering Co., Boston, Mass.

MERRITT & Co., Camden, N. J.

NEW Britain Machine Co., New Britain, Conn.

OHIO Mfg. Co., Painesville, O.

TERRELL'S Equipment Co., Grand Rapids, Mich.

VAN Dorn Iron Works, Cleveland, O.

WESTERN Tool & Mfg. Co., Springfield, O.

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ALIGNING REAMERS

HARDING Distributing Co., 28 School St., Boston, Mass. "Martell"

MARTELL—See Harding Distributing Co.

STANDARD AND ADJUSTABLE REAMERS

ACME—See Schellenbach-Hunt Tool Co.

ADAMANTINE—See American Tap & Die Co.

AMERICAN Tap & Die Co., Greenfield, Mass. "Adamantine." (See page 551.)

BILLINGS & Spencer Co., Hartford, Conn.

BRUBAKER & Bros., W. L., Millersburg, Pa.

BUTTERFIELD & Co., Derby Line, Vt.

CELFOR Tool Co., Buchanan, Mich.

CHADWICK & Trefethan, Portsmouth, N. H. "Critchley."

CLEVELAND Twist Drill Co., Cleveland, O. "Paradox," "Peerless."

CLOUGH, R. M., Tolland, Conn.

CRITCHLEY—See Chadwick & Trefethan.

DETROIT Twist Drill Co., 657-69 Fort St., Detroit, Mich. (See page 489.)

DIAMOND—See Whitman & Barnes Mfg. Co.

GISHOLT Machine Co., Madison, Wis.

GRANT Nail & Supply Co., Boston, Mass. "Turney."

GREEN RIVER—See Greenfield Tap & Die Co.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Little Giant," "Lightning," "Green River."

HERCULES—See Wells & Son Co.

KELLY Reamer Co., Cleveland, O.

LIGHTNING—See Greenfield Tap & Die Co.

LINCOLN-WILLIAMS Twist Drill Co., Taunton, Mass.

LITTLE GIANT—See Greenfield Tap & Die Co.

McCROSKY Reamer Co., Meadville, Pa.

MORSE Twist Drill & Machine Co., New Bedford, Mass.

NATIONAL Twist Drill & Tool Co., Detroit, Mich.

OHIO Reamer Co., Cleveland, O.

ONE Lock Reamer Co., New Haven, Conn.

PARADOX—See Cleveland Twist Drill Co.

PEERLESS—See Cleveland Twist Drill Co.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

ROGERS Works, John M., Gloucester City, N. J.

SCHELLENBACH-HUNT Tool Co., Cincinnati, O. "Acme."

STANDARD Tool Co., Cleveland, O.

STAPF & Co., John B., Dunkirk, N. Y.

TURNEY—See Grant Nail & Supply Co.

WELLS & Son Co., F. E., Greenfield, Mass. "Hercules."

WHITMAN & Barnes Mfg. Co., Akron, O. "Diamond."

VALVE STEM GUIDE REAMERS

HEALY Tool & Appliance Co., 62-64 Pearl St., Buffalo, N. Y. (See page 419.)

REGISTERS

AUTOGRAPHIC AND MANIFOLD REGISTERS

AMERICAN Sales Book Co., Elmira, N. Y.

AUTOGRAPHIC Register Co., Hoboken, N. J. "Shouperior."

EGRY Register Co., Dayton, O. (See page 541.)

McCASKEY Register Co., Alliance, O.

SHOUPERIOR—See Autographic Register Co.

REMAGNETIZERS

MAGNET REMAGNETIZERS

END—Oxy Appliance Co., Trenton, N. J.

METZGER-DANIELS Co., Portland, Ore.

PEERLESS—See Sauermann Motor Co.

ST. LOUIS Electrical Works, St. Louis, Mo.

SAUERMANN Motor Co., Rock Island, Ill. "Peerless."

RIDDLES

FOUNDRY RIDDLES AND SIEVES

BUFFALO Wire Works Co., Buffalo, N. Y.

DARBY & Sons Co., Edward, Philadelphia, Pa.

DEAN & Co., Henry E., Worcester, Mass.

TAYLOR & Dean, Pittsburg, Pa.

TYLER Co., W. S., Cleveland, O.

WRIGHT Wire Co., Worcester, Mass.

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Protect your business, giving you that perfect control over each and every transaction as to cause you to overcome losses and make you master of your business.

Adopt the Egry—accept no substitute.

Write today for further details—no obligation to purchase.

Our Garage Bulletin awaits your call.

SYSTEMS EGRY REGISTER COMPANY +SERVICE

THE EGRY REGISTER COMPANY, Dayton, Ohio

YOU CAN

Improve the Finish — and — Increase your Production

Our automatic rapid drying system does both. Dries all coatings on wood and metal. Total actual drying time on 15 coats, 48 hours. Used by leading automobile manufacturers. Used in repainting shops.

For particulars, write sole owners and patentees.

Wenborne-Karpen Dryer Co.

1122 Karpen Building Chicago, Ill.

Don't Spend a Fortune on High Spoed Steel

You can reduce your investment in High Speed Steel to one-tenth the amount needed in Forged Tools besides SAVING all Forging and nearly all the Grinding by using

Armstrong Tool Holders

on your LATHES and PLANERS

They are used in most of the Big Machine Shops of the World.

Write for Free Catalog illustrating and describing 100 styles and sizes of Lathe and Planer Tool Holders for Turning, Boring, Cutting off, Threading, Drilling, Planing, Slotting, Shaping and Knurling Metals. Also a full line of Ratchet Drills, C Clamps, Drilling Vises, Lathe Dogs, Wrenches, Drill Drifts, Lathe Tool Posts, Planer Jacks, Drilling Posts, etc.

Armstrong Bros. Tool Co.

"The Tool Holder People"

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ROLLS

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BADGER State Machine Co., Janesville, Wis.

BERTSCH & Co., Cambridge City, Ind.

HUNTINGTON Machine & Foundry Co., Huntington, Ind.

KANE & Roach, Syracuse, N. Y.

NEW Doty Mfg. Co., Janesville, Wis.

NIAGARA Machine & Tool Works, Buffalo, N. Y.

NILES-BEMENT-POND Co., New York, N. Y.

PERKINS Machine Co., Warren, Mass.

PETTINGELL Machine Co., Amesbury, Mass.

ROCK River Machine Co., Janesville, Wis.

TOLEDO Machine & Tool Co., Toledo, O.

WHITCOMB-BLAISDELL Machine Tool Co., Worcester, Mass.

WHITING Co., Geo., Chicago, Ill.

ROOMS

PAINT AND VARNISH DRYING ROOMS

WENBORNE-KARPEN Dryer Co., 1122 Karpen Bldg., Chicago, Ill. (See page 541.)

RULES

STEEL RULES

ATHOL Machine Co., Athol, Mass.

BILLINGS & Spencer Co., Hartford, Conn.

BROWN & Sharpe Mfg. Co., Providence, R. I.

CHAPIN-STEPHENS Co., Pine Meadow, Conn.

GOODELL-PRATT Co., Greenfield, Mass.

KEUFFEL & Esser Co., Hoboken, N. J.

LUFKIN Rule Co., Saginaw, Mich.

STANLEY Rule & Level Co., New Britain, Conn.

STARRETT Co., L. S., Athol, Mass.

UNION Caliper Co., Orange, Mass.

WYKE, J., Wilmington, Mass.

SANDERS

WOOD SANDERS

AMERICAN Woodworking Machinery Co., Rochester, N. Y.

BENTEL & Margedant Co., Hamilton, O.

BERLIN Machine Works, Beloit, Wis.

CORDESMAN, Meyer & Co., Cincinnati, O.

CORDESMAN-RECHTIN Co., Cincinnati, O.

DEFIANCE Machine Works, Defiance, O.

FAY & Egan Co., J. A., Cincinnati, O.

JONES Superior Machine Co., Chicago, Ill.

KANE & Roach, Syracuse, N. Y.

OBER Mfg. Co., Chagrin Falls, O.

OLIVER Machinery Co., Grand Rapids, Mich.

PEERLESS Surface Machine Co., Newark, N. J.

PRYIBIL Machine Co., P., New York, N. Y.

ROOT Co., B. M., York, Pa.

SMITH Machine Co., H. B., Smithville, N. J.

WYSONG & Miles Co., Greensboro, N. C.

SAWS

BAND SAWING MACHINES

AMERICAN Saw Mill Machinery Co., New York, N. Y.

AMERICAN Woodworking Machinery Co., Rochester, N. Y.

BENTEL & Margedant Co., Hamilton, O.

BERLIN Machine Works, Beloit, Wis.

CORDESMAN, Meyer & Co., Cincinnati O.

CORDESMAN-RECHTIN Co., Cincinnati, O.

CRESCENT Machine Co., Leetonia, O.

DEFIANCE Machine Works, Defiance, O.

FAY & Egan Co., J. A., Cincinnati, O.

GOODSPEED Machine Co., Winchendon, Mass.

GREAVES-KLUSMAN Tool Co., Cincinnati, O.

HALL & Brown Woodworking Machine Co., St. Louis, Mo.

HILES & Co., C. A., Chicago, Ill.

JONES Superior Machine Co., Chicago, Ill.

KANE & Roach, Syracuse, N. Y.

MARSTON & Co., J. M., Boston, Mass.

OLIVER Machinery Co., Grand Rapids, Mich.

POWER & Co., L., Philadelphia, Pa.

PRYIBIL Machine Co., P., New York, N. Y.

ROOT Co., B. M., York, Pa.

SILVER Mfg. Co., Salem, O.

SMITH Machine Co., H. B., Smithville, N. J.

WEST Side Iron Works, Grand Rapids, Mich.

CIRCULAR SAW TABLES

AMERICAN Saw Mill Machinery Co., New York, N. Y.

AMERICAN Woodworking Machinery Co., Rochester, N. Y.

BAKER Bros., Toledo, O.

BEACH Mfg. Co., Montrose, Pa.

BENTEL & Margedant Co., Hamilton, O.

CATARACT Brass Stamping Corp., Buffalo, N. Y.

CORDESMAN, Meyer & Co., Cincinnati, O.

CRESCENT Machine Co., Leetonia, O.

FAY & Egan Co., J. A., Cincinnati, O.

GREAVES-KLUSMAN Tool Co., Cincinnati, O.

GREENLEE Bros. & Co., Rockford, Ill.

MARSTON & Co., J. M., Boston, Mass.

OLIVER Machinery Co., Grand Rapids, Mich.

POWER & Co., L., Philadelphia, Pa.

PRYIBIL Machine Co., P., New York, N. Y.

ROOT Co., B. M., York, Pa.

SMITH Machine Co., H. B., Smithville, N. J.

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Paterson

Model 43—40 H. P. 5 Passenger Touring car Price, $1,600.00

Model 47—45 H. P. 7 Passenger Touring car Price, $1950.00

All Paterson Cars Have

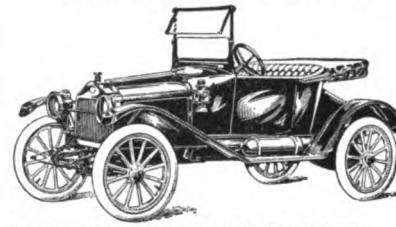
Long Stroke Motors, Long Wheel-base, Unit Power Plant, Three Point Suspension, Complete Equipment, Electric Lights, Self Starters.

And all the tried-out successful devices that tend to reduce the up-keep and improve the riding qualities and ease of operation.

W. A. PATERSON CO.
Flint, Michigan

METZ—$495

The Gearless Car
Winner of the Glidden Tour



NEW FOREDOOR MODEL

Stream line body, left-hand drive, center control, wide comfortable seat, extra thick tufted upholstery, plate glass rain-vision wind shield constructed in two sections, each adjustable for rain and ventilation.

Four-cylinder 22½ H.P. water-cooled motor, Bosch high tension magneto, Prest-O-Lite tank, gearless transmission, full elliptic springs, extension top, artillery wheels, best quality Goodrich clincher tires, 5 lamps, horn, pump, jack and tool outfit.

TO DEALERS: The new METZ "22" completely meets the demand for a small car that is reliable in performance and economical in operation. We want a representative in every city and town. Write us for terms and new catalog "A.D."

Metz Company, Waltham, Mass., U.S.A.

Detroiter

FOURS AND EIGHTS

The finest American creations in the moderate price class.

$850 and upward

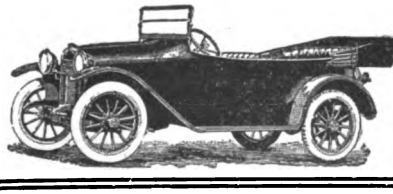
Full Floating Rear Axle, Platform Rear Spring Suspension, All Recording Instruments in One Unit, Red Electric Flash Oil Gauge, Carburetor above Frame, 112-Inch Wheel Base, Left Hand Drive, Center One-Lever Control, Multiple Disc Clutch in Oil, Less than 2300 Pounds, 32 h.p.

Electric Starting and Lighting

Briggs-Detroiter Co.

537 Holbrook Ave. Detroit, Mich.

Write for Catalog and Proposition



Maxwell

$695

17 New features in the 1915 Maxwell

The biggest automobile value ever offered for less than $1,000.

Powerful, fast, silent and smooth running. A superb, fully equipped, real 5-passenger family automobile.

Practically all the high priced features of high priced cars.

Come and let us take you riding in the new 1915 Maxwell.

HOLDS THE ROAD AT 50 MILES AN HOUR.

With Electric Starter and Electric Lights $55 Extra

Write for Catalog.

MAXWELL MOTOR CO., Inc.
DETROIT, MICH.

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SAWS (Continued)

COLD SAW CUTTING-OFF MACHINES

BILLINGS & Spencer Co., Hartford, Conn.

BURKE Machine Tool Co., Conneaut, O.

BURR & Sons, John T., Brooklyn, N. Y.

COCHRANE-BLY Co., Rochester, N. Y.

ESPEN-LUCAS Machine Works, Philadelphia, Pa.

HIGLEY Machine Co., New York, N. Y.

LEA Equipment Co., Philadelphia, Pa. "Lea-Simplex."

LEA-SIMPLEX—See Lea Equipment Co.

MOTOR Parts Co., Plainfield, N. J.

NUTTER & Barnes Co., Hinsdale, N. H.

TINDEL-MORRIS Co., Eddystone, Pa.

HAND SAWS

(Rip and Cross Cut)

ATKINS & Co., E. C., Indianapolis, Ind.

BISHOP & Co., Geo. H. Lawrenceburg, Ind. "Greyhound."

CENTRAL Hardware Co., Philadelphia, Pa.

DISSTON & Sons, Henry, Philadelphia, Pa.

GREYHOUND—See Bishop & Co.

JENNINGS & Co., C. E., New York, N. Y.

OHLEN & Sons Saw Mfg. Co., James, Columbus, O.

PENNSYLVANIA Saw Co., Frackville, Pa.

SIMONDS Mfg. Co., Fitchburg, Mass.

POWER HACK SAWS

ARMSTRONG-BLUM Mfg. Co., Chicago, Ill. "Marvel."

ATKINS & Co., E. C., Indianapolis, Ind. "Kwik-Kut."

BUFFALO Specialty Co., Buffalo, N. Y. "Duplex."

DAYTON Machine Works, Dayton, O. "Victor."

DIAMOND Saw & Stamping Works, Buffalo, N. Y. "Sterling."

DUPLEX—See Buffalo Specialty Co.

ECONOMY—See Robertson Machine & Foundry Co.

FRONTIER Iron Works, Buffalo, N. Y. "Royal."

GOODELL-PRATT Co., Greenfield, Mass.

HOEFER Mfg. Co., Freeport, Ill.

KWIK-KUT—See Atkins & Co.

MARVEL—See Armstrong-Blum Mfg. Co.

MASSACHUSETTS Saw Works, Springfield, Mass.

MILLERS Falls Co., New York, N. Y.

MOTOR Parts Co., Plainfield, N. J.

NORTH Wales Machine Co., North Wales, Pa.

OLMSTED'S Son, L. H., Hasbrouck Heights, N. J.

RACINE Tool & Machine Co., Racine, Wis.

ROBERTSON Machine & Foundry Co. W., Buffalo, N. Y. "Economy."

ROYAL—See Frontier Iron Works.

STAR—See Miller's Falls Co.

STERLING—See Diamond Saw & Stamping Works.

STORY, H. T., Chicago, Ill.

THOMPSON & Son Co., Henry G., New Haven, Conn.

UNIVERSAL—See West Haven Mfg. Co.

VICTOR—See Dayton Machine Works.

WESTERN Tool & Mfg. Co., Springfield, O.

WEST Haven Mfg. Co., New Haven, Conn. "Universal."

SWING SAWS

AMERICAN Woodworking Machinery Co., Rochester, N. Y.

BADGER State Machine Co., Janesville, Wis.

BERLIN Machine Works, Beloit, Wis.

CONNELL & Dengler Machine Co., Rochester, N. Y.

CORDESMAN, Meyer & Co., Cincinnati, O.

CORDESMAN-RECHTIN Co., Cincinnati, O.

CRESCENT Machine Co., Leetonia, O.

DEFIANCE Machine Works, Defiance, O.

FAY & Egan Co., J. A., Cincinnati, O.

GREAVES-KLUSMAN Tool Co., Cincinnati, O.

GREENLEE Bros. & Co., Rockford, Ill.

HALL & Brown Woodworking Machine Co., St. Louis, Mo.

JONES Superior Machine Co., Chicago, Ill.

KANE & Roach, Syracuse, N. Y.

OLIVER Machinery Co., Grand Rapids, Mich.

PORTER Machinery Co., C. O., Grand Rapids, Mich.

ROOT Co., B. M., York, Pa.

SILVER Mfg. Co., Salem, O.

SMITH Machine Co., H. B., Smithville, N. J.

HOT SAWS

BILLINGS & Spencer Co., Hartford, Conn.

HILES & Co., C. A., Chicago, Ill.

LEWIS Foundry & Machine Co., Pittsburg, Pa.

INSERTED TOOTH SAWS

BUCKEYE Saw Mfg. Co., Columbus, O.

DISSTON & Sons, Henry, Philadelphia, Pa. "Premier."

HUNTER Saw & Machine Co., Pittsburg, Pa.

OHLEN & Sons Saw Mfg. Co., James, Columbus, O.

PREMIER—See Disston & Sons.

SIMONDS Mfg. Co., Fitchburg, Mass.

TABOR Mfg. Co., Philadelphia, Pa. "Taylor-Newbold."

TAYLOR-NEWBOLD—See Tabor Mfg. Co.

TINDEL-MORRIS Co., Eddystone, Pa.

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The Greatest Tribute Ever Paid the Stearns

You discriminating persons who watch epochs in motor car history now have something wonderful to reflect upon:

Never before has the Stearns-Knight received such acknowledgment of supremacy as it has this season.

Stearns sales are steadily increasing, and have been during the past year.

The month of May, just passed, was the greatest month in the history of our business.

The past ninety days, not only show the best spring season in our history —but show an increase of 27½ per cent in actual sales over the corresponding period of 1913.

In every direction our business has strengthened and increased during the past twelve months.

It is largely due to realization by the discriminating person that he cannot afford to sacrifice what the Stearns gives him exclusively.

The F. B. Stearns Co.
Cleveland, Ohio

REGAL

Dominant in the REGAL are the vital essentials of Motoring Satisfaction:

Beauty
Power
Comfort
Economy

The public demand these qualifications in a motor car.

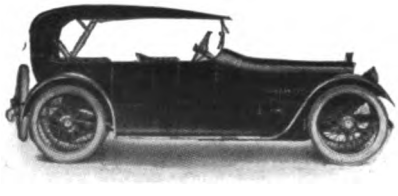
The REGAL offers them.

Regalize and Realize

Touring Car $1085 Roadster

Regal Motor Car Company
Detroit Michigan

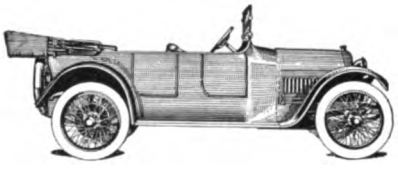
PULLMAN
MODEL 6-48
A MODERN CLASSIC



Price $2500
Including VULCAN ELECTRIC GEAR SHIFT

Fours and Sixes, $740 to $3000

PULLMAN MOTOR CAR CO.
York Pa.



The balance of the car is as good as the motor—and the Moline-Knight is the World's Greatest Motor.

MOLINE KNIGHT

More Power
$2500
Completely Equipped

Write for Booklet

New models include four-speed transmission, spiral gear, rear axle. Complete Line Touring Car, Roadster, Sedan and Limousine. Get our Dealers Plan, prices and terms.

MOLINE AUTOMOBILE CO.
300 Palmer Street East Moline, Ill.

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SCRAPERS

BEARING SCRAPERS

ALERT Tool Co., 221-23 N. 23d St., Philadelphia, Pa. (See page 533.)

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BUFFUM Tool Co., Louisiana, Mo.

HAYES File Co., Detroit, Mich.

KRAEUTER & Co., Newark, N. J.

LUTZ—See Western Tool & Mfg. Co.

MARCY Tool Works, Putnam, Conn.

MOUND Tool Co., Seventh & Hickory Sts., St. Louis, Mo. (See page 475.)

VLCHEK Tool Co., Cleveland, O.

WESTERN Tool & Mfg. Co., Springfield, O. "Lutz."

SCRIBERS

MACHINISTS SCRIBERS

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BROWN & Sharpe Mfg. Co., Providence, R. I.

GOODELL-PRATT Co., Greenfield, Mass.

JOHNSON, Wm., Newark, N. J.

STARRETT Co., L. S., Athol, Mass.

WEST Haven Mfg. Co., New Haven, Conn.

SEPARATORS

AIR SEPARATORS

PANGBORN Corp., Hagerstown, Md.

OIL SEPARATORS

AMERICAN Tool & Machine Co., Boston, Mass. "Roper."

ROPER—See American Tool & Machine Co.

SETS

RIVET SETS

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

CARVER Tool Works, Spring Valley, N. Y

DREW & Co., C., Kingston, N. Y.

JOHNSON, Wm., Newark, N. J.

KRAEUTER & Co., Newark, N. J.

LOWENTRAUT Mfg. Co., P., Newark, N. J.

PECK, Stow & Wilcox Co., Southington, Conn.

VAN DOREN Mfg. Co., Chicago Heights, Ill. "Vandor."

VANDOR—See Van Doren Mfg. Co.

VAUGHAN & Bushnell Mfg. Co., Chicago, Ill.

SHAPERS

METAL SHAPERS

AMERICAN Tool Works Co., Cincinnati, O.

BOYNTON & Plummer, Worcester, Mass.

CINCINNATI Shaper Co., Cincinnati, O.

GOULD & Eberhardt, Newark, N. J.

HENDEY Machine Co., Torrington, Conn.

JUENGST & Sons, Geo., Croton Falls, N. Y.

KELLY Co., R. A., Xenia, O.

LUTTER & Gies Co., Milwaukee, Wis. "Milwaukee."

MILWAUKEE—See Lutter & Gies.

NILES-BEMENT-POND Co., New York, N. Y.

OHIO Machine Tool Co., Kenton, O.

POTTER & Johnston Machine Co., Pawtucket, R. I.

QUEEN City Machine Tool Co., Cincinnati, O.

ROCKFORD Machine Tool Co., Rockford, Ill.

SMITH & Mills Co., Cincinnati, O.

SPRINGFIELD Machine Tool Co., Springfield, O.

STAPF & Co., John B., Dunkirk, N. Y.

STEPTOE Shaper Co., John, Cincinnati, O.

STOCKBRIDGE Machine Co., Worcester, Mass.

WALCOTT & Wood Machine Tool Co., Jackson, Mich.

WOOD SHAPERS

ADVANCE Machinery Co., Toledo, O.

AMERICAN Woodworking Machinery Co., Rochester, N. Y.

BARKER & Co., Wm., Covington, Ky.

BENTEL & Margedant Co., Hamilton, O.

BERLIN Machine Works, Beloit, Wis.

CORDESMAN, Meyer & Co., Cincinnati, O.

CORDESMAN-RECHTIN Co., Cincinnati, O.

CRESCENT Machine Co., Leetonia, O.

DEFIANCE Machine Works, Defiance, O.

FAY & Egan Co., J. A., Cincinnati, O.

HALL & Brown Woodworking Machine Co., St. Louis, Mo.

JONES Superior Machine Co., Chicago, Ill.

PORTER Machinery Co., C. O., Grand Rapids, Mich.

POWER & Co., L., Philadelphia, Pa.

PRYIBIL Machine Co., P., New York, N. Y.

SMITH Machine Co., H. B., Smithville, N. J.

WHITNEY & Son, Baxter D., Winchendon, Mass.

SHARPENERS

FILE SHARPENERS

AMERICAN File Sharpener Co., Brooklyn, N. Y.

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"Road-View" Shield Visor

THIS RAPIDLY SELLING ACCESSORY IS A BIG MONEY MAKER FOR PROGRESSIVE DEALERS

This tremendously popular accessory fastens to the front bow of the top, projecting downward, so as to modify light reflections and keep rain, snow and sleet from obstructing the vision. It makes driving safer and more comfortable and adds to the appearance of the car. A patent friction joint enables it to be set at any desired tension for automatic operation.

If it is desired to lower the top the "Road-View" sets flatly up against the top and folds back out of the way.

You will find a ready sale and a good profit on this accessory.

8½" x 39" overall $5.00
8½" x 41" overall $5.50

PROMPT DELIVERY ON IMMEDIATE ORDERS
DISCOUNT TO DEALERS IS LIBERAL

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SPOKE SHAVES

CINCINNATI Tool Co., Norwood, O. "Hargrave."

GOODELL-PRATT Co., Greenfield, Mass.

HARGRAVE—See Cincinnati Tool Co.

JOHNSON, Wm., Newark, N. J.

OHIO Tool Co., Charleston, W. Va.

STANLEY Rule & Level Co., New Britain, Conn.

WHITE Co., L. & I. J., Buffalo, N. Y.

SHEARS

LEVER SHEARS

BADGER State Machine Co., Janesville, Wis.

BERTSCH & Co., Cambridge City, Ind.

BICKNELL Mfg. & Supply Co., Janesville, Wis.

EDWARDS, C. D., Albert Lea, Minn.

FARREL Foundry & Machine Co., Ansonia, Conn.

NIAGARA Machine & Tool Works, Buffalo, N. Y.

PECK, Stow & Wilcox Co., Southington, Conn.

ROBINSON Mfg. Co., J. M., Cincinnati, O.

SCHATZ Mfg. Co., Poughkeepsie, N. Y.

WATERBURY Farrel Foundry & Machine Co., Waterbury, Conn.

SHOVELS

MOLDERS SHOVELS

AMES & Sons Corp., Oliver, North Easton, Mass.

BEALL Bros., Alton, Ill.

HUBBARD & Co., Pittsburg, Pa.

PFEIFER & Co., John, Philadelphia, Pa.

PITTSBURG Shovel Co., Pittsburg, Pa.

WOOD Shovel & Tool Co., Piqua, O.

WYOMING Shovel Works, Wyoming, Pa.

SLOTTERS

SCREW SLOTTERS

DAVIS Sewing Machine Co., Dayton, O.

GARVIN Machine Co., New York, N. Y.

MANVILLE Machine Co., E. J., Waterbury, Conn.

NATIONAL-ACME Mfg. Co., Cleveland, O. (See page 395.)

SNIPS

METAL SNIPS OR SHEARS

ACME Shear Co., Bridgeport, Conn. "Ajax," "Star."

AJAX—See Acme Shear Co.

BARTLETT Mfg. Co., Detroit, Mich.

BERGMAN Tool Mfg. Co., Buffalo, N. Y.

BRIDGEPORT Hardware Mfg. Corp., Bridgeport, Conn.

CLAUSS Shear Co., Fremont, O.

DUDLY Tool Co., Menominee, Mich.

HEINISCH'S Sons Co., R., Newark, N. J.

KRAEUTER & Co., Newark, N. J.

NATIONAL Cutlery Co., Philadelphia, Pa.

PECK, Stow & Wilcox Co., Southington, Conn.

STAR—See Acme Shear Co.

STORTZ & Son, John, Philadelphia, Pa.

WISS & Sons Co., J., Newark, N. J.

SOLDER

ALUMINUM SOLDER

ACME—See Universal Fluxine Co.

ALL-METALS Co., Box 34, N. End Station, Detroit, Mich. (See page 477.)

ALUMALUX Co., Sidney, O.

ALUMIFIX—See Specialties Sales Co.

ARROW—See Lester Co.

ATKINSON Co., Rochester, N. Y. (See page 261.)

CITY Brass Foundry Co., Cleveland, O.

ELECTRIC Smelting & Aluminum Co., Lockport, N. Y.

ILLINOIS Smelting & Refining Co., Chicago, Ill.

JANNEY, Steinmetz & Co., Philadelphia, Pa. "Richards." (See page 403.)

LANGSENKAMP, F. H., Indianapolis, Ind.

LESTER Co., Fayetteville, N. Y. "Arrow."

LUMEN Bearing Co., Buffalo, N. Y. (See pages 195 and 259.)

MORE-JONES Brass & Metal Co., St. Louis, Mo.

NATIONAL Products Co., Kokomo, Ind.

RICHARDS—See Janney, Steinmetz & Co.

RICHARDS & Co., Boston, Mass.

SEMPER IDEM—See Wildes Son.

SPECIALTIES Sales Co., Kansas City, Mo. "Alumifix."

THWING, C. B., Philadelphia, Pa.

UNIVERSAL Fluxine Co., Urbana, O. "Acme."

VAN Metal Co., Columbus, O.

WILDES Son, Thomas, New York, N. Y. "Semper Idem."

HALF AND HALF SOLDER

BIRKENSTEIN & Sons, S., 387-99 W. Ontario St., Chicago, Ill. (See page 477.)

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PAIGE

The Paige Line for 1915

offers a wonderful opportunity to dealers who desire to build profitable and permanent businesses.

Write for our attractive dealer's proposition.

Paige-Detroit Motor Car Company
DETROIT, MICHIGAN

Lexington
CRITERION OF ITS CLASS

A Four, a Light Six, and a Six Supreme

Moore Multiple Exhaust System

22.8% More Horse Power! Considerably Less Fuel!

We have a worth-while proposition for a few more reputable dealers. *Your* territory may be open. Better find out about it! Do it now.

Literature Gladly Sent Upon Request

The Lexington Howard Co.
Connersville, Ind., U. S. A.

Daniel Boone Model $2222

2-5-7 Passenger

Write for complete catalog and Pathfinder Sales Plan

THE MOTOR CAR MFG. CO.
BOX 584
Indianapolis, U. S. A.

ROTARY

The First Car in America with Rotary Valve Motor

No other motor can show such **simplicity, freedom from valve wear, silence, lack of vibration, power, efficiency** and **long life.**

Speedwell Rotary Six Motor Cars, fully equipped, sell for **$2850** and **$2950.**

The Speedwell Motor Car Co.
Dayton, Ohio

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SOLDER (Continued)

HALF AND HALF SOLDER (Continued)

BLATCHFORD Co., E. W., Chicago, Ill.

COLUMBIA Smelting & Refining Works, Brooklyn, N. Y.

EMPIRE Metal Co., Syracuse, N. Y.

GARDINER Metal Co., Chicago, Ill.

HENNING & Sons, V., Brooklyn, N. Y.

HOYT Metal Co., 300 N. Broadway, St. Louis, Mo. (See page 105.)

KAHN Bros., Brooklyn, N. Y.

LEHMAN Bros., Hoboken, N. J.

LISSBERGER & Son, Marks, Long Island City, N. Y.

LUMEN Bearing Co., Buffalo, N. Y. (See pages 195 and 259.)

MERCHANT & Evans Co., Philadelphia, Pa.

MORE-JONES Brass & Metal Co., St. Louis, Mo.

NATIONAL Lead Co., New York, N. Y. (See page 353.)

OLD Roman Solder Co., New York, N. Y.

TAYLOR Co., N. & G., Philadelphia, Pa.

WILDES Son, Thomas, New York, N. Y.

SQUARES

MACHINISTS SQUARES

ATHOL Machine Co., Athol, Mass.

BROWN & Sharpe Mfg. Co., Providence, R. I.

GOODELL-PRATT Co., Greenfield, Mass.

STARRETT Co., L. S., Athol, Mass.

UNION Caliper Co., Orange, Mass.

STAMPS

STEEL STAMPS

(For Numbering or Lettering Parts)

BALZER Co., Gus., New York, N. Y.

BECKER Engraving Co., August, Boston, Mass.

CHANDLER Co., Springfield, Mass.

DUNKIRK Corp., Dunkirk, N. Y.

EVERETT & Son, A., Auburn, N. Y.

HOGGSON & Pettis Mfg. Co., New Haven, Conn.

KAUTZ & Co., Fred C., Chicago, Ill.

KNIGHT & Son, H. W., Seneca Falls, N. Y.

MATTHEWS & Co., Jas. H., Pittsburg, Pa.

MAYER Co., Geo. J., Indianapolis, Ind.

MURDOCK, Jr., Co., Jas., Cincinnati, O.

NESS, Jr., Geo. M., New York, N. Y.

NEW York Stencil Works, New York, N. Y.

NOBLE & Westbrook Mfg. Co., Hartford, Conn.

ROBBINS Mfg. Co., John, Boston, Mass.

SCHWERDTLE Stamp Co., Bridgeport, Conn.

WRIGHT & Son, Greg. G., Cincinnati, O.

STANDS

MOTOR REPAIR STANDS

HACO—See Hathorn Auto Co.

HATHORN Auto Co., Mason City, Ia. "Haco."

ST. ALBANS Foundry & Implement Co., St. Albans, Vt.

PORTABLE TOOL STANDS

NEW BRITAIN Machine Co., 10 Bigelow St., New Britain, Conn. (See page 519.)

WESTERN Tool & Mfg. Co., Springfield, O.

STOCKS

DIE STOCKS

ACME—See American Tap & Die Co.

ADAMANTINE—See American Tap & Die Co.

AMERICAN Tap & Die Co., Greenfield, Mass. "Acme," "Adamantine." (See page 551.)

ARMSTRONG Mfg. Co., Bridgeport, Conn.

BAY State Tap & Die Co., Mansfield, Mass.

BESLY & Co., Charles H., Chicago, Ill.

BRUBAKER & Bros., W. L., Millersburg, Pa.

BUTTERFIELD & Co., Derby Line, Vt.

CARD Mfg. Co., S. W., Mansfield, Mass.

CARPENTER Tap & Die Co., J. M., Pawtucket, R. I.

CONANT & Donelson Co., Conway, Mass. "Reliable."

DUPLEX—See Hart Mfg. Co.

ECONOMY—See Wells & Son Co.

GREEN RIVER—See Greenfield Tap & Die Co.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Little Giant," "Lightning," "Green River."

HART Mfg. Co., Cleveland, O. "Duplex."

LIGHTNING—See Greenfield Tap & Die Co.

LITTLE GIANT—See Greenfield Tap & Die Co.

LOWELL Wrench Co., Worcester, Mass.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

REECE Co., E. F., Greenfield, Mass.

RELIABLE—See Conant & Donelson.

THISTLE—See Winter Bros. Co.

WELLS & Son Co., F. E., Greenfield, Mass. "Economy."

WINTER Bros. Co., Wrentham, Mass. "Thistle."

Complete Index to Classification appears on Pages 8 to 26.

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A. L. A. M. STANDARD

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MACHINE SCREW, HAND AND NUT TAPS AND DIES FOR MANUFACTURERS

Send for Catalogue and Discounts

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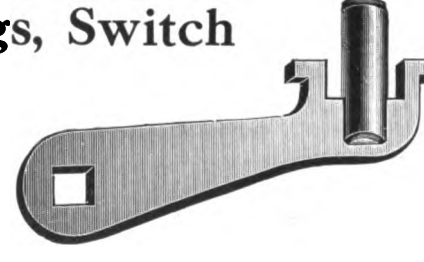
Oil Cups

Bushings, Switch Keys



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STONES

RUBBING STONES

AMERICAN Stone Co., Floyds Knobs, Ind. "Perrettes."

BENDER BIMSSTEIN—See Thurston Co.

EUREKA—See Waddell & Co.

EUREKA Rubbing Stone Co., Chicago, Ill.

GAMBURGER-BIMSSTEIN—See Rodriguez, R. E.

PERRETTES—See American Stone Co.

RHODES & Co., J. H., Chicago, Ill. (Importers.)

RODRIGUEZ, R. E., New York, N. Y. (Importer.) "Gamburger Bimsstein."

SCHUMACHERSCHE—See Waddell & Co.

THURSTON Co., F. W., Chicago, Ill. (Importer.) "Bender Bimsstein."

WADDELL & Co., R. J., New York, N. Y. (Importers.) "Schumachersche," "Eureka."

WADSWORTH, Howland & Co., Boston, Mass.

STOOLS

STEEL STOOLS

CLARK Co., W. J., Salem, O.

CLEVELAND Wire Spring Co., Cleveland, O.

ERIE Stamping & Mfg. Co., Erie, Pa.

KALAMAZOO Steel Goods Co., Kalamazoo, Mich.

MANUFACTURING, Equipment & Engineering Co., Boston, Mass.

MERRITT & Co., Camden, N. J.

NEW Britain Machine Co., New Britain, Conn.

OHIO Mfg. Co., Painesville, O.

SUPPLIES

ELECTRO-PLATING SUPPLIES

(This is a list of Dealers in Electro-Plating Supplies who advertise in this publication)

STEVENS, Frederic B., Detroit, Mich. (See pages 527 and 528.)

FOUNDRY SUPPLIES

BRASS Founders Supply Co., Newark, N. J.

HILL & Griffith Co., Cincinnati, O.

NIAGARA Devices, Buffalo, N. Y.

OBERMAYER Co., S., Cincinnati, O.

OSBORN Mfg. Co., Cleveland, O.

PAXSON Co., J. W., 1019 N. Delaware Ave., Philadelphia, Pa. (See page 523.)

SMITH Foundry Supply Co., J. D., Cleveland, O.

STEVENS, Frederic B., Detroit, Mich. (See pages 527 and 528.)

WOODISON Co., E. J., Detroit, Mich.

MACHINE SHOP, GARAGE AND FACTORY SUPPLIES

(This is a list of Dealers in Machine Shop, Garage and Factory Supplies, who advertise in this publication)

FRASSE & Co., Peter A., New York, N. Y. (See page 425.)

MONTGOMERY & Co., 105-07 Fulton St., New York, N. Y. (See page 501.)

SWAGES

TOP AND BOTTOM SWAGES

(See Fullers and Swages)

SYSTEMS

SAND BLAST SYSTEMS

PANGBORN Corp., Hagerstown, Md.

TILGHMAN-BROOKSAND Sand Blast Co., Philadelphia, Pa.

TANKS

CHEMICAL FIRE TANKS

ACCURATE—See National Metal Stamping & Mfg. Co.

CHAMPION—See National Metal Stamping & Mfg. Co.

HOLLOWAY—See National Metal Stamping & Mfg. Co.

NATIONAL Metal Stamping & Mfg. Co., Newark, N. J. "Accurate," "Holloway," "Champion."

TAPES

MEASURING TAPES

KEUFFEL & Esser Co., Hoboken, N. J.

LUFKIN Rule Co., Saginaw, Mich.

STARRETT Co., L. S., Athol, Mass.

TAPS

TAPS AND DIES

ACME—See American Tap & Die Co.

ADAMANTINE—See American Tap & Die Co.

AMERICAN Tap & Die Co., Greenfield, Mass. "Adamantine," "Acme." (See page 551.)

BAY State Tap & Die Co., Mansfield, Mass.

BESLY Co., Charles H., Chicago, Ill.

BRUBAKER & Bros., W. L., Millersburg, Pa.

BUTTERFIELD & Co., Derby Line, Vt. "Derby."

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4,000 In Use

Six standard models: 1,000 lb. (chain or worm drive) 2,000, 4,000, 7,000, 10,000 lbs. capacity.

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NEW YORK CHICAGO BOSTON PHILADELPHIA

$485 THE SALVADOR CYCLE CAR $485

Motor Car Value at Cycle Car Price

The Salvador car embodies a four cylinder water cooled motor, with selective transmission in unit with motor; shaft drive, center control, left hand drive and full cantilever springs; meets all the requirements of the discriminating buyer.

Correspondence and bids for territory solicited. Write for detail specifications.

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are Nationally Advertised. Every magazine of repute carries the Rauch & Lang message. The selling of Rauch & Lang Electrics will prove most profitable. Write us regarding our sales plan if you are contemplating entering the automobile business.

THE RAUCH & LANG CARRIAGE COMPANY

2180 West 25th Street, Cleveland, Ohio

THE JEFFERY CHESTERFIELD SIX

Jeffery

Dominates the 1915 field of Little Sixes as positively as the Jeffery Four leads the field of Fours—as it also did in 1914.

A few specifications: European type high speed, high efficiency motor, 3 x 5; rich Tungsten valves; worm drive; full floating axle; spicer universals; Daimler leather coupling; imported ball bearings throughout; cantilever springs; Bijur starting and lighting; Stewart vacuum feed. One man top. Price $1,650.

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TAPS (Continued)

TAPS AND DIES (Continued)

CARD Mfg. Co., S. W., Mansfield, Mass.

CARPENTER Tap & Die Co., J. M., Pawtucket, R. I.

CHAMPION Blower & Forge Co., Lancaster, Pa.

CONANT & Donelson Co., Conway, Mass. "Reliable."

DERBY—See Butterfield & Co.

DETROIT Twist Drill Co., 657-69 Fort St., Detroit, Mich. (See page 489.)

GEOMETRIC Tool Co., New Haven, Conn.

GREEN RIVER—See Greenfield Tap & Die Co.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Little Giant," "Lightning," "Green River."

HELMET—See Besly & Co.

HERCULES—See Wells & Son Co.

LIGHTNING—See Greenfield Tap & Die Co.

LITTLE GIANT—See Greenfield Tap & Die Co.

MANUFACTURERS Equipment Co., Chicago, Ill.

MORSE Twist Drill & Machine Co., New Bedford, Mass.

PRATT & Whitney Co., Hartford, Conn. (See page 463.)

REED & Prince Mfg. Co., Worcester, Mass.

RELIABLE—See Conant & Donelson.

REMINGTON Tool & Machine Co., Woburn, Mass.

STANDARD Tool Co., Cleveland, O.

SUPERIOR Tap Co., Charlestown, N. H.

THISTLE—See Winter Bros. Co.

WEBSTER & Perks Tool Co., Springfield, O.

WELLS & Son Co., F. E., Greenfield, Mass. "Hercules."

WINTER Bros. Co., Wrentham, Mass "Thistle."

TOOLS

LATHE AND PLANER TOOLS

ARMSTRONG Bros. Tool Co., 304 N. Francisco Ave., Chicago, Ill. (See page 541.)

BILLINGS & Spencer Co., Hartford, Conn.

CHAMPION—See Western Tool & Mfg. Co.

CHAMPION Welding & Mfg. Co., Buffalo, N. Y. "Vulcan."

JOHNSON—See Pratt & Whitney Co.

MARCY Tool Works, Putnam, Conn.

NOBLE & Westbrook Mfg. Co., Hartford, Conn.

O. K. Tool Holder Co., Shelton, Conn.

PRATT & Whitney Co., Hartford, Conn. "Johnson," "Rhodes," "Woodbridge." (See page 463.)

RHODES—See Pratt & Whitney Co.

STORTZ & Son, John, Philadelphia, Pa.

THOMPSON & Son Co., Henry G., New Haven, Conn.

VULCAN—See Champion Welding & Mfg. Co..

WESTERN Tool & Mfg. Co., Springfield, O. "Champion."

WOODBRIDGE—See Pratt & Whitney Co.

MOLDERS TOOLS

DOBSON, Wm., Canastota, N. Y.

MONK, Chas., Brooklyn, N. Y.

PLANER TOOLS

(See Tools, Lathe and Planer)

PNEUMATIC TOOLS

CHICAGO Pneumatic Tool Co., Chicago, Ill.

CLEVELAND Pneumatic Tool Co., Cleveland, O.

DAYTON Pneumatic Tool Co., Dayton, O. "Green."

DUNLAP Mfg. Co., Columbus, O.

GREEN—See Dayton Pneumatic Tool Co.

HELWIG Mfg. Co., St. Paul, Minn.

INDEPENDENT Pneumatic Tool Co., Chicago, Ill. "Thor."

INGERSOLL-RAND Co., 11 Broadway, New York, N. Y. "Little David." (See page 535.)

LITTLE DAVID—See Ingersoll-Rand Co.

MONARCH Pneumatic Tool Co., East St. Louis, Ill.

OLDHAM & Son Co., George, Philadelphia, Pa.

PITTSBURG Pneumatic Co., Canton, O.

THOR—See Independent Pneumatic Tool Co.

THREADING TOOLS

ARMSTRONG Bros. Tool Co., 304 N. Francisco Ave., Chicago, Ill. (See page 541.)

GEOMETRIC Tool Co., New Haven, Conn.

MODERN Tool Co., Erie, Pa.

RIVETT Lathe & Grinder Co., Boston, Mass.

TORCHES

GASOLINE OR KEROSENE TORCHES AND FURNACES

AMERICAN Stove Co. (Ringen Div.), St. Louis, Mo.

AMERICAN Stove Co. (Reliable Stove Co. Div.), Cleveland, O. "Reliable."

BABY—See McGill Mfg. Co.

BARTHEL—See Globe Gas Light Co.

BERNZ, Otto, Newark, N. J.

BEST Light Co., Canton, O.

CARLETON Co., Boston, Mass. "Imp."

CLAYTON & Lambert Mfg. Co., Detroit, Mich.

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30 DAYS FREE TRIAL

If not satisfied return the signal and receive your money back.

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$5.—NO NEED TO PAY MORE!

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GLOBE Gas Light Co., Boston, Mass. "Barthel."

HAUCK Mfg. Co., Brooklyn, N. Y.

IMP—See Carleton Co.

McGILL Mfg. Co., Valparaiso, Ind. "Baby."

QUADRIGA Mfg. Co., Chicago, Ill. "Walters."

RELIABLE—See American Stove Co.

TURNER Brass Works, Sycamore, Ill.

VOLCANO Torch & Mfg. Co., Erie, Pa.

WALL Mfg. Supply Co., P., Pittsburg, Pa.

WALTERS—See Quadriga Mfg. Co.

WESTINGHOUSE Electric & Mfg. Co., Pittsburg, Pa.

TRAMMELS

TRAMMEL POINTS

GOODELL-PRATT Co., Greenfield, Mass.

STARRETT Co., L. S., Athol, Mass.

TRIMMERS

WOOD TRIMMERS

(Hand Power)

FOX Machine Co., Grand Rapids, Mich.

OLIVER Machinery Co., Grand Rapids, Mich.

VISES

DRILL PRESS VISES

ARMSTRONG-BLUM Mfg. Co., Chicago, Ill. "Marvel."

ARMSTRONG Bros. Tool Co., 304 N. Francisco Ave., Chicago, Ill. (See page 541.)

BLISSFIELD Motor Works, Blissfield, Mich. "Davenport."

BOWN Machine Co., Battle Creek, Mich.

CARTER & Hakes Co., Winsted, Conn.

CLEVELAND Machine Specialty Co., Cleveland, O.

DAVENPORT—See Blissfield Motor Works.

GRAHAM Mfg. Co., Providence, R. I.

HOGGSON & Pettis Mfg. Co., New Haven, Conn.

LIGHTNING—See Massey Vise Co.

MADDEN Bros. Co., Rushville, Ind.

MARVEL—See Armstrong-Blum Mfg. Co.

MASSEY Vise Co., Chicago, Ill. "Lightning."

MATHER & Warchter, Cleveland, O.

NORTH Wales Machine Co., North Wales, Pa.

PLUNKET, J. E., Chicago, Ill.

SKINNER Chuck Co., New Britain, Conn.

STERLING Grinding Wheel Co., Tiffin, O.

YOST Mfg. Co., G. M., Meadville, Pa.

HAND VISES

ATHOL Machine Co., Athol, Mass.

BILLINGS & Spencer Co., Hartford, Conn.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

DIKEMAN Mfg. Co., Norwalk, Conn.

GOODELL-PRATT Co., Greenfield, Mass.

LOWELL Wrench Co., Worcester, Mass.

MALLEABLE Iron Fittings Co., Branford, Conn. "Mifco." (See page 485.)

MIFCO—See Malleable Iron Fittings Co.

MILLER'S Falls Co., New York, N. Y.

PHOENIX Hardware Co., Buffalo, N. Y.

SMITH, Otis A., Rockfall, Conn.

MACHINISTS VISES

AJAX—See Bonney Vise & Tool Works.

ANCHOR—See Prentiss Vise Co.

ATHOL Machine Co., Athol, Mass. "Simpson."

BARBOUR-STOCKWELL Co., Cambridgeport, Mass.

BARRETT Machine Tool Co., Meadville, Pa.

BONNEY Vise & Tool Works, Allentown, Pa. "Hercules," "Ajax."

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BULL DOG—See Prentiss Vise Co.

CLINCHER—See Massey Vise Co.

COLUMBIAN Hardware Co., Cleveland, O.

EMMERT Mfg. Co., Waynesboro, Pa. "Tiger."

ERIE Tool Works, Erie, Pa.

F & R—See Fulton Machine & Vise Co.

FISHER & Norris, Trenton, N. J.

FULTON Machine & Vise Co., Lowville, N. Y. "Star," "Peerless," "F. & R."

GOODELL-PRATT Co., Greenfield, Mass.

HERCULES—See Bonney Vise & Tool Works.

HOLLANDS Mfg. Co., Erie, Pa.

HOWARD Iron Works, Buffalo, N. Y.

JERSEY—See Stanley Rule & Level Co.

LEWIS—See Prentiss Vise Co.

LIGHTNING—See Massey Vise Co.

MASSEY Vise Co., Chicago, Ill. "Clincher," "Perfect," "Lightning."

MERRILL Bros., Maspeth, N. Y.

MONARCH—See Prentiss Vise Co.

PARKER Co., Charles, Meriden, Conn.

PEERLESS—See Fulton Machine & Vise Co.

PERFECT—See Massey Vise Co.

PHOENIX Hardware Co., Buffalo, N. Y.

PITTSBURG Automatic Vise & Tool Co., Pittsburg, Pa.

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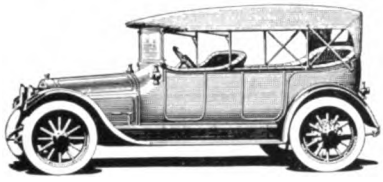

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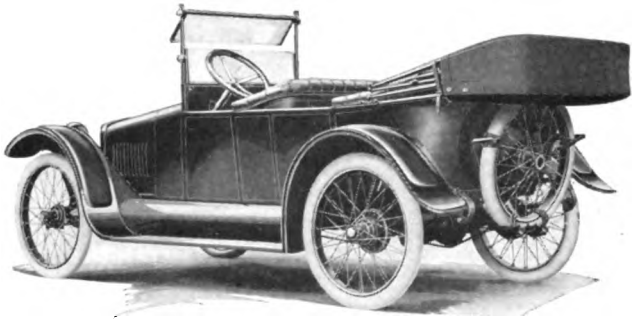

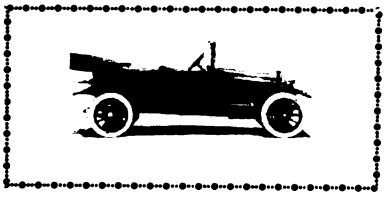

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It has everything, size, power, speed, comfort, equipment and luxurious appointments, that a motorist could desire and the price is within reach of every motor car buyer.

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R. C. HUPP, Pres.

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VISES (Continued)

MACHINISTS VISES (Continued)

PRENTISS Vise Co., New York, N. Y. "Anchor," "Bull Dog," "Lewis," "Monarch," "Rapid Transit."

RAPID TRANSIT—See Prentiss Vise Co.

REED Mfg. Co., Erie, Pa.

ROCK Island Mfg. Co., Rock Island, Ill.

SIMPSON—See Athol Machine Co.

STANLEY Rule & Level Co., New Britain, Conn. "Jersey."

STAR—See Fulton Machine & Vise Co.

TIGER—See Emmert Mfg. Co.

YOST Mfg. Co., G. M., Meadville, Pa.

MILLING MACHINE VISES

CARTER & Hakes Co., Winsted, Conn.

HENDLEY Machine Co., Torrington, Conn.

LIGHTNING—See Massey Vise Co.

MASSEY Vise Co., Chicago, Ill. "Lightning."

PATTERN MAKERS AND WOODWORKERS VISES

ABERNATHY Vise & Tool Co., Chicago, Ill.

ATHOL Machine Co., Athol, Mass.

AYES & Co., Chicago, Ill.

BARBOUR-STOCKWELL Co., Cambridgeport, Mass. "Chandler & Washburn."

BLAKE—See Prentiss Vise Co.

BONNEY Vise & Tool Works, Allentown, Pa.

CHANDLER & WASHBURN—See Barbour-Stockwell Co.

CLINCHER—See Massey Vise Co.

COLUMBIAN Hardware Co., Cleveland, O.

EMMERT Mfg. Co., Waynesboro, Pa.

FISHER & Norris, Trenton, N. J.

HOLLANDS Mfg. Co., Erie, Pa.

LIGHTNING—See Massey Vise Co.

MASSEY Vise Co., Chicago, Ill. "Lightning," "Clincher."

OLIVER Machinery Co., Grand Rapids, Mich.

PARKER Co., Charles, Meriden, Conn.

PITTSBURG Automatic Vise & Tool Co., Pittsburg, Pa.

PRENTISS Vise Co., New York, N. Y. "Blake."

ROCK Island Mfg. Co., Rock Island, Ill.

TOLES Co., W. C., Chicago, Ill.

WYMAN & Gordon Co., Worcester, Mass. (See Back Bone.)

YOST Mfg. Co., G. M., Meadville, Pa.

PIN VISES

BERGMAN Tool Mfg. Co., Buffalo, N. Y.

BILLINGS & Spencer Co., Hartford, Conn.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

GOODELL-PRATT Co., Greenfield, Mass.

LOWELL Wrench Co., Worcester, Mass.

STARRETT Co., L. S., Athol, Mass.

PIPE VISES

ARMSTRONG Mfg. Co., Bridgeport, Conn.

BLAKE—See Prentiss Vise Co.

DIKEMAN Mfg. Co., Norwalk, Conn.

EMMERT Mfg. Co., Waynesboro, Pa. "Tiger."

ERIE Tool Works, Erie, Pa.

FISHER & Norris, Trenton, N. J.

HOLLANDS Mfg. Co., Erie, Pa.

IDEAL—See Orange Machine & Mfg. Co.

MAGIC—See Prentiss Vise Co.

MARK Mfg. Co., Chicago, Ill.

MASSEY Vise Co., Chicago, Ill. "Perfect."

MONARCH—See Prentiss Vise Co.

ORANGE Machine & Mfg. Co., Orange, N. J. "Ideal."

OSWEGO Tool Co., Oswego, N. Y.

PARKER Co., Charles, Meriden, Conn.

PERFECT—See Massey Vise Co.

PITTSBURG Automatic Vise & Tool Co., Pittsburg, Pa.

PRENTISS Vise Co., New York, N. Y. "Blake," "Monarch," "Rex," "20th Century," "Shepard," "Magic."

REED Mfg. Co., Erie, Pa.

REX—See Prentiss Vise Co.

ROCK Island Mfg. Co., Rock Island, Ill.

SAUNDERS Sons, D., Yonkers, N. Y.

SHEPARD—See Prentiss Vise Co.

TIGER—See Emmert Mfg. Co.

20TH CENTURY—See Prentiss Vise Co.

WALWORTH Mfg. Co., Boston, Mass.

WELLS & Son Co., F. E., Greenfield, Mass.

YOST Mfg. Co., G. M., Meadville, Pa.

PLANER VISES

BROWN & Sharpe Mfg. Co., Providence, R. I.

HENDEY Machine Co., Torrington, Conn.

LIGHTNING—See Massey Vise Co.

MASSEY Vise Co., Chicago, Ill. "Lightning."

SPECIAL AND PORTABLE VISES

BONNEY Vise & Tool Works, Allentown, Pa.

F & R—See Fulton Machine & Vise Co.

FULTON Machine & Vise Co., Lowville, N. Y. "F & R."

PARKER Co., Charles, Meriden, Conn.

PITTSBURG Automatic Vise & Tool Co., Pittsburg, Pa.

ROCK Island Mfg. Co., Rock Island, Ill.

WOODWORKERS VISES

(See Vises, Patternmakers and Woodworkers)

WAYS

BALANCING WAYS

DEFIANCE Machine Works, Defiance, O.

ROCKFORD Tool Co., Rockford, Ill.

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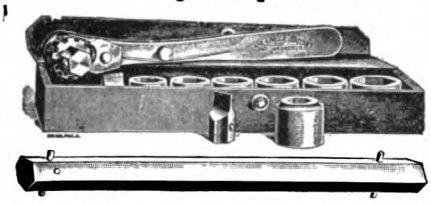

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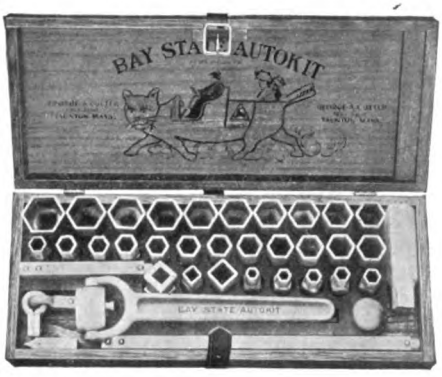
Chicago, Ill.
Formerly of Philadelphia, Pa.



Bay State Autokit

will reach any nut on any car. Heavy reversible ratchet. White nickel finish. Neat black case mahogany finished inside.

Made in two sizes.

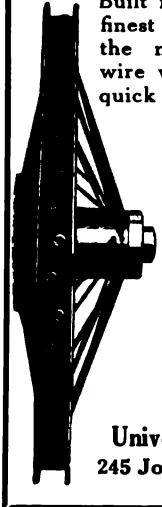
$10.00—$7.50

WRITE FOR CIRCULARS

GEO. A. CUTTER, Sales Agent
Taunton Mass

SPRANGER

Demountable Rim High Grade Wire Wheel



Built in all sizes, made from the finest materials, the Spranger is the new idea in super-strong wire wheels with a tight-locking quick demountable rim. The Spranger spokes are fastened to a steel channel felloe, which bears all the strains.

Beautifully finished in black enamel with red rims, the Ford Car size sells for $32.50 f. o. b. Detroit, including four wheels and five rims. A great proposition for dealers.

Universal Car Equipment Co.
245 John R. St., Detroit, U. S. A.

CRESCENT TOOLS

CRESCENT Adjustable Wrench

The most efficient wrench on the market. Original in design, neat and compact. made in four sizes. Polished and nickel-plated finish.

Our money-back guarantee with every tool.

Thin Bent Nose Pliers

Made of a high grade quality of steel. Will work where ordinary pliers won't. In one size only. Nickel or black finish.

SEND TO-DAY FOR OUR REDUCED PRICE LIST

Crescent Tool Co.
JAMESTOWN, NEW YORK

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WHEELS

BUFFING AND POLISHING WHEELS

CHICAGO Wheel & Mfg. Co., Chicago, Ill.

DAY Mfg. Co., S. A., Buffalo, N. Y.

DIVINE Bros. Co., Utica, N. Y.

EASTERN Felt Co., Winchester, Mass.

EASTERN Polishing Supply Co., Easton, Pa.

FOOT Mfg. Co., Jersey City, N. J.

WILLIAMSVILLE Buff Mfg. Co., Danielson, Conn.

GRINDING WHEELS

ABRASIVE Material Co., Philadelphia, Pa.

AMERICAN Emery Wheel Works, Providence R. I.

BAY State Emery Wheel Co., Worcester, Mass.

BRIDGEPORT Safety Emery Wheel Co., Bridgeport, Conn.

BUFFALO Emery Wheel Co., Buffalo, N. Y.

CARBORUNDUM Co., Niagara Falls, N. Y.

CHICAGO Wheel & Mfg. Co., Chicago, Ill.

CORTLAND Corundum Wheel Co., Cortland, N. Y.

DETROIT Emery Wheel Co., Detroit, Mich. "Hart."

ELECTRIC Emery Wheel Co., Newark, N. J.

HART—See Detroit Emery Wheel Co.

NATIONAL Corundum Wheel Co., Buffalo, N. Y.

NORTHAMPTON Emery Wheel Co., Leeds, Mass.

NORTON Co., Worcester, Mass.

PIKE Mfg. Co., Pike, N. H.

PITTSBURG Emery Wheel Co., Pittsburg, Pa.

SAFETY Emery Wheel Co., Springfield, O.

SPRINGFIELD Mfg. Co., Bridgeport, Conn.

STAR Corundum Wheel Co., Detroit, Mich.

STERLING Grinding Wheel Co., Tiffin, O.

SUPERIOR Corundum Wheel Co., Waltham, Mass.

VITRIFIED Wheel Co., Westfield, Mass.

WALTHAM Emery Wheel Co., Waltham, Mass.

POLISHING WHEELS

(See Wheels, Buffing and Polishing)

WINDERS

SPRING WINDERS

NATIONAL Mfg. & Sales Co., Toledo, O.

REMINGTON Tool & Machine Co., Woburn, Mass.

WRENCHES

NUT AND BOLT WRENCHES

AGNER Co., Raymond C., Burlington, Wis.

ALLAN Specialty Mfg. Co., A. C., Chicago, Ill.

ALLEN Wrench & Tool Co., Providence, R. I.

ALDERMAN—See Mossberg Co.

AMERICAN Thermo Ware Co., New York, N. Y. (Importers.) "Hercules."

ARMSTRONG Bros. Tool Co., 304 N. Francisco Ave., Chicago, Ill. (See page 541.)

AUTO CLE—See Mossberg Co.

AUTO KING—See Azadian Gauge Mfg. Co.

AUTO QUEEN—See C. M. B. Wrench Co.

AUTOMATIC Wrench Co., Boston, Mass. "Barnsley."

AZADIAN Gauge Mfg. Co., Syracuse, N. Y. "Auto King."

B. & C.—See Bemis & Call Hardware & Tool Co.

BARCALO Mfg. Co., Buffalo, N. Y. (See page 563.)

BARNES Tool Co., New Haven, Conn.

BARNSLEY—See Automatic Wrench Co.

BAY STATE AUTOKIT—See Cutter, Geo. A.

BEMIS & Call Hardware & Tool Co., Springfield, Mass. "B. & C."

BILLINGS & Spencer Co., Hartford, Conn.

BONNER Tool Co., Champaign, Ill. "Victor."

BONNEY Vise & Tool Works, Allentown, Pa.

BORNSTEIN & Co., Ipswich, Mass.

BOSSERT Co., Utica, N. Y. (See page 223.)

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BRIDGEPORT Hardware Mfg. Corp., Bridgeport, Conn.

BUFFUM Tool Co., Louisiana, Mo.

C. M. B. Wrench Co., Garwood, N. J. "Silver King." "Auto Queen."

CHAMBERLAIN Wrench Co., Geneva, Ill.

CHAMPION—See Syracuse Wrench Co.

COCHRAN Pipe Wrench Mfg. Co., Chicago, Ill. "Speednut."

COES Wrench Co., Worcester, Mass.

CONVERTIBLE Ratchet Wrench Co., Allentown, Pa.

CRESCENT Tool Co., Jamestown, N. Y. (See page 559.)

CRONK & Carrier Mfg. Co., Elmira, N. Y.

CUTTER, Geo. A., Taunton, Mass. "Bay State Autokit." "Stickit." (See page 559.)

DAYTON Malleable Iron Co., Dayton, O.

DIAMOND—See Mossberg Co.

DUDLY Tool Co., Menominee, Mich.

EAGLE Claw Wrench Co., Rockford, Ill.

EMPIRE—See Hjorth & Co.

ERIE Stamping & Mfg. Co., Erie, Pa. "Esco."

ESCO—See Erie Stamping & Mfg. Co.

GARAGE Equipment Mfg. Co., Milwaukee, Wis. "Gemco." (See page 83.)

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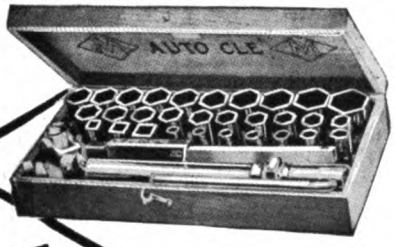

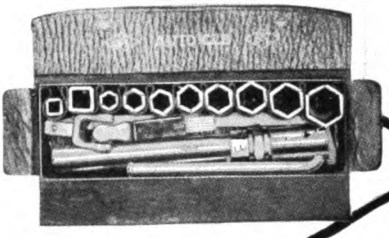

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The oldest and original set of ratchet socket wrenches.

MOSSBERG

Guaranteed M **Sockets**

You really do not need to dread adjusting those "hard-to-get-at" nuts and bolts—**Mossberg** handles go "'round the corner"—and every **Mossberg** article is **Absolutely Guaranteed! Your** automobile will welcome a friendship with Mossberg wrench sets—will **you** introduce them?

WRITE FOR CATALOG 162.

FRANK MOSSBERG COMPANY
ATTLEBORO, MASS.

Made and sold for Motor Parts Co., of Plainfield, N. J.

120 R

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WRENCHES (Continued)

NUT AND BOLT WRENCHES (Continued)

GEMCO—See Garage Equipment Mfg. Co.

GIRARD Wrench Mfg. Co., Girard, Pa.

GLOBE Wrench Co., Ipswich, Mass.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Little Giant."

GRIPSALL—See Mossberg Co.

GUERNSEY, C. C., Derry, N. H.

HARRIS & Reed Mfg. Co., Chicago, Ill.

HERBRAND Co., Fremont, O.

HERCULES—See American Thermo Ware Co.

HJORTH & Co., Wm., Jamestown, N. Y. "Empire."

INDIANAPOLIS Drop Forging Co., Indianapolis, Ind.

KEYSTONE—See Providence Auto Equipment

KEYSTONE Mfg. Co., Buffalo, N. Y. "Westcott."

KILBORN & Bishop Co., New Haven, Conn. "Saxon."

LAKESIDE Forge Co., Erie, Pa.

LAMSON & Sessions Co., Cleveland, O.

LANE, Will B., 180 N. Dearborn St., Chicago, Ill. "Unique." (See page 559.)

LITTLE GIANT—See Greenfield Tap & Die Co.

LOWELL Wrench Co., Worcester, Mass.

LOWENTRAUT Mfg. Co., P., Newark, N. J. "U. S."

MICHIGAN Bolt & Nut Works, Detroit, Mich.

MOORE Drop Forging Co., Springfield, Mass.

MOSSBERG Co., Frank, Attleboro, Mass. "Sterling," "Diamond," "Alderman," "National," "Auto Cle," "Gripsall." (See page 561.)

NATIONAL—See Mossberg Co.

NATIONAL Jack & Mfg. Co., Chicago, Ill.

NEW Britain Mfg. Co., New Britain, Conn.

NEW England Forge Co., Worcester, Mass.

NIAGARA Falls Metal Stamping Works, Niagara Falls, N. Y. "Pokitrenchiz."

PACKER Auto Specialty Co., Chicago, Ill. "Ray."

PAGE-STORMS Drop Forge Co., Chicopee, Mass.

PECK, Stow & Wilcox Co., Southington, Conn.

PERFECT HANDLE—See Smith & Co.

PICK-UP—See New Britain Mfg. Co.

POKITRENCHIZ—See Niagara Falls Metal Stamping Works.

PROVIDENCE Auto Equipment Co., Providence, R. I. "Keystone."

RAY—See Packer Auto Specialty Co.

REX Wrench Co., Boston, Mass.

RONSON Specialty Co., Newark, N. J.

S. & I. Co., Springfield, Mass.

SAXON—See Kilborn & Bishop Co.

SCHOENBORN, A. J., Greenleaf, Kans.

SCHOLLER Mfg. Co., Buffalo, N. Y.

SILVER KING—See C. M. B. Wrench Co

SMITH & Co., H. D., Plantsville, Conn. "Perfect Handle."

SPEEDNUT—See Cochran Pipe Wrench Mfg. Co.

STARRETT Co., L. S., Athol, Mass.

STERLING—See Mossberg Co.

STICKIT—See Cutter, Geo. A.

SYRACUSE Wrench Co., Syracuse, N. Y. "Champion," "Yala."

TRIMO—See Trimont Mfg. Co.

TRIMONT Mfg. Co., Roxbury, Mass. "Trimo." (See page 563.)

TURNER & Deegan, Bristol, Conn.

U. S.—See Lowentraut Mfg. Co.

UNIQUE—See Lane, Will B.

VICTOR—See Bonner Tool Co.

VLCHEK Tool Co., Cleveland, O.

WAKEFIELD, Clarence E., Worcester, Mass.

WALDEN Mfg. Co., 72 Commercial St., Worcester, Mass. (See page 563.)

WESTCOTT—See Keystone Mfg. Co.

WHITMAN & Barnes Mfg. Co., Akron, O.

WILLIAMS & Co., J. H., Brooklyn, N. Y.

WORCESTER Pressed Steel Co., Worcester, Mass. (See page 157.)

WRIGHT Wrench & Forging Co., Canton, O.

YALA—See Syracuse Wrench Co.

PIPE WRENCHES

AJAX Wrench Co., Toledo, O.

AMERICAN—See Rogers-Shear Co.

ARMSTRONG Mfg. Co., Bridgeport, Conn.

BONNER Tool Co., Champaign, Ill. "Victor."

BONNEY Vise & Tool Works, Allentown, Pa. "Vixen."

COCHRAN Pipe Wrench Mfg. Co., Chicago, Ill.

DANIELSON & Co., J. P., Jamestown, N. Y.

DUDLY Tool Co., Menominee, Mich.

EMPIRE—See Hjorth & Co.

ERIE Stamping & Mfg. Co., Erie, Pa. "Esco."

ERIE Tool Works, Erie, Pa.

ESCO—See Erie Stamping & Mfg. Co.

FAIRBANKS—See Rogers-Shear Co.

HJORTH & Co., Wm., Jamestown, N. Y. "Empire."

IRELAND Pipe Wrench Co., Boston, Mass.

KEYSTONE Mfg. Co., Buffalo, N. Y. "Westcott."

LEADER—See Ripley Pipe Wrench Co.

LUTZ-WEBSTER Engineering Co., Philadelphia, Pa.

MOORE Drop Forging Co., Springfield, Mass.

OSWEGO Tool Co., Oswego, N. Y.

RIPLEY Pipe Wrench Co., Ripley, N. Y. "Leader."

ROEBLING'S Sons Co., John A., Trenton, N. J.

ROGERS-SHEAR Co., Warren, Pa. "American," "Fairbanks."

Complete Index to Classification appears on Pages 8 to 26.

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WALDEN WORCESTER WRENCHES

Ratchet Wrenches
Socket Wrenches
Brace Wrenches

Tire and Rim Wrenches

RATCHET
Socket Wrench Sets

Special FORD Wrenches

Send for Complete Catalog.

Waldon Mfg. Co., Worcester, Mass.
72 Commercial St.

Barcalo-Buffalo
on 7", 9", 11",
14" and 18"

Auto Wrenches

No. 182—9 in. Auto Wrench

Barcalo Manufacturing Co.
Buffalo, N. Y.

Excel both in Quality and Prices.
Write Barcalo for quantity prices.

BARCALO-BUFFALO

TRIMO AUTO TOOLS

Send for Catalog No. 120

OUR NEW NARROW AUTO MONKEY WRENCH
Made in 10-Inch Polished Only

AUTO NARROW-JAW PIPE WRENCH
Made in 6-Inch, 8-Inch and 10-Inch Sizes

Manufactured by

Trimont Manufacturing Co.
ROXBURY (BOSTON), MASS.

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WRENCHES (Continued)

PIPE WRENCHES (Continued) (Continued)

SHAW Propeller Co., Boston, Mass.

STILLSON—See Walworth Mfg. Co.

STOVER—See Wright Wrench & Forging Co.

TRIMO—See Trimont Mfg. Co.

TRIMONT Mfg. Co., Roxbury, Mass. "Trimo." **(See page 563.)**

VICTOR—See Bonner Tool Co.

VIXEN—See Bonney Vise & Tool Works.

WALWORTH Mfg. Co., Boston, Mass. "Stillson."

WELLS & Son Co., F. E., Greenfield, Mass.

WESTCOTT—See Keystone Mfg. Co.

WRIGHT Wrench & Forging Co., Canton, O. "Stover."

TAP AND REAMER WRENCHES

ADAMANTINE—See American Tap & Die Co.

ALERT Tool Co., 221-23 N. 23d St., Philadelphia, Pa. **(See page 533.)**

AMERICAN Tap & Die Co., Greenfield, Mass. "Adamantine." **(See page 551.)**

ARMSTRONG Mfg. Co., Bridgeport, Conn.

BAY State Tap & Die Co. Mansfield, Mass.

BERGMAN Tool Mfg. Co., Buffalo, N. Y.

BESLY & Co., Charles H., Chicago, Ill.

BILLINGS & Spencer Co., Hartford, Conn.

BRAUNSDORF-MUELLER Co., Elizabeth, N. J.

BRUBAKER & Bros., W. L., Millersburg, Pa.

BUTTERFIELD & Co., Derby Line, Vt.

CARD Mfg. Co., S. W., Mansfield, Mass.

CARPENTER Tap & Die Co., J. M., Pawtucket, R. I. "Nichols."

CONANT & Donelson Co., Conway, Mass. "Reliable."

DIKEMAN Mfg. Co., Norwalk, Conn.

GOODELL-PRATT Co., Greenfield, Mass.

GREEN RIVER—See Greenfield Tap & Die Co.

GREENFIELD Tap & Die Co., Greenfield, Mass. "Little Giant," "Lightning," "Green River."

HART Mfg. Co., Cleveland, O.

HERCULES—See Wills & Son Co.

KEYSTONE Mfg. Co., Buffalo, N. Y.

LIGHTNING—See Greenfield Tap & Die Co.

LITTLE GIANT—See Greenfield Tap & Die Co.

MORSE Twist Drill & Machine Co., New Bedford, Mass.

NICHOLS—See Carpenter Tap & Die Co.

RELIABLE—See Conant & Donelson.

SAUNDERS' Sons, D., Yonkers, N. Y.

STANDARD Tool Co., Cleveland, O.

STARRETT Co., L. S., Athol, Mass.

UNION Caliper Co., Orange, Mass.

WELLS & Son Co., F. E., Greenfield, Mass. "Hercules."

WEST Haven Mfg. Co., New Haven, Conn.

Manufacturers are requested to send us copies of all catalogues as soon as issued. This will assist us in listing your name in this Directory under the proper classification or classifications and will then be placed in our file for reference.

THE AUTOMOBILE TRADE DIRECTORY
243-249 West 39th Street New York

Complete Index to Classification appears on Pages 8 to 26.

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Tables and Data

PART IV

Reference Tables, Data and Formulæ, including Reports on Tests of Materials, S. A. E. Standards, etc., also a Directory of National Trade Associations

A complete index to this section appears on pages 27 to 30

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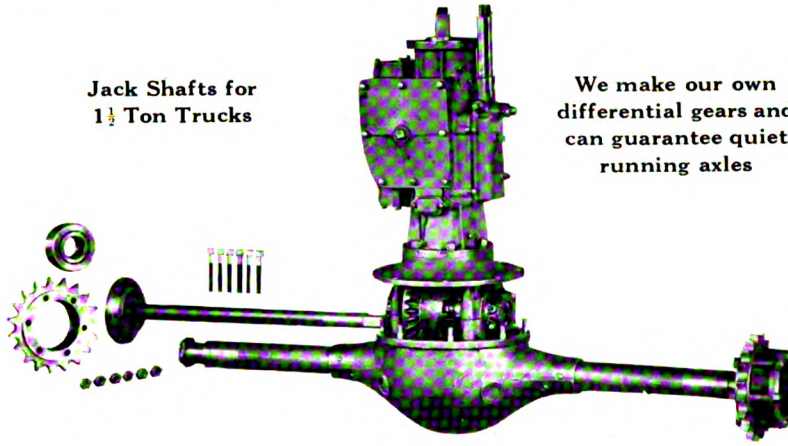
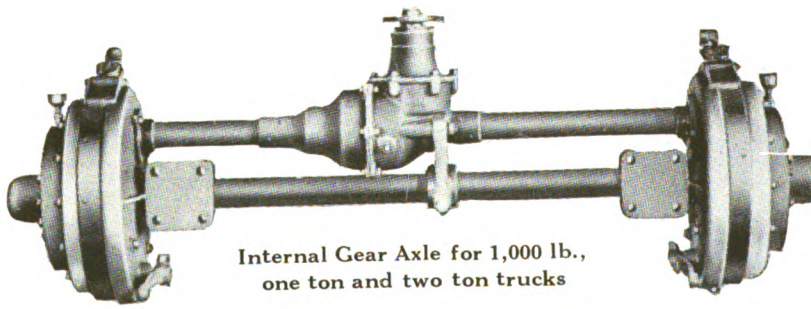
Jack Shafts for
1½ Ton Trucks

We make our own
differential gears and
can guarantee quiet
running axles

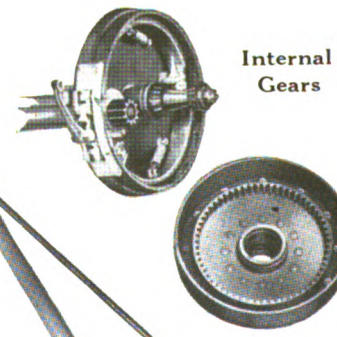




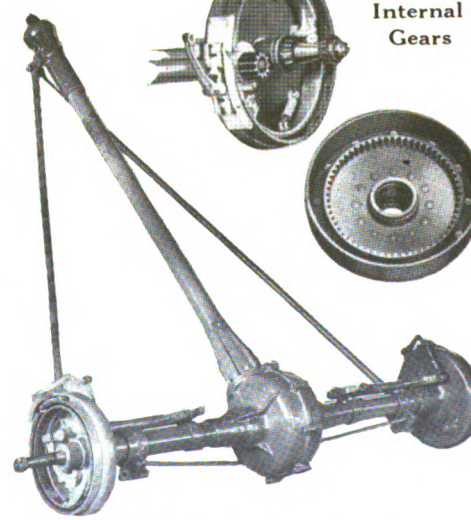
Internal Gear Axle for 1,000 lb.,
one ton and two ton trucks

RUSSEL MOTOR AXLE CO.

NORTH DETROIT
MICHIGAN



Internal
Gears



Axles for light pleasure cars

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PART IV

TABLES AND DATA

HORSEPOWER FORMULAS

Four-Stroke Cycle Engines

Authority	Formula
A. L. A. M. / Royal Auto. Club	$\frac{D^2N}{2.5} = H.P.$
Brit. Inst. of Auto. Engrs.	$0.45\,(D+L)\,(D-1.18) = H.P.$
E. P. Roberts	$\frac{D^2LRN}{18{,}000} = H.P.$

D = Diam. of cylinder in inches.
L = Length of stroke in inches.
R = Rev. per min. of crankshaft.
N = Number of cylinders.

Derivation of the A. L. A. M. Horsepower Formula

The indicated horsepower of a single-cylinder, four-cycle engine is equal to one-quarter times the mean effective pressure P, acting throughout the working stroke, times the area of the piston A, in square inches, times the piston speed S divided by 33,000, thus,

$$\text{I. H. P} = \tfrac{1}{4}\frac{P\,A\,S}{33{,}000}$$

Multiplying this by the number of cylinders N gives the I. H. P. for an engine of the given number of cylinders, and further multiplying by the mechanical efficiency of the engine E gives the brake horsepower. Therefore the complete equation for B. H. P. reads:

$$\text{B. H. P.} = \frac{P\,A\,S\,N\,E}{33{,}000 \times 4}$$

The A. L. A. M. assumed that all motor car engines will deliver or should deliver their rated power at a piston speed of 1,000 feet per minute, that the mean effective pressure in such engine cylinders will average 90 pounds per square inch, and that the mechanical efficiency will average 75%.

Substituting these values in the above B. H. P. equation, and substituting for A its equivalent, $.7854\ D^2$, the equation reads:

$$\text{B. H. P.} = \frac{90 \times .7854\ D^2 \times 1{,}000 \times N \times .75}{33{,}000 \times 4}$$

and combining the numerical values it reduces to:

$$\text{B. H. P.} = \frac{D^2N}{2.489}$$

or, in round numbers, with a denominator 2.5.

H. P. TABLE BY A. L. A. M. FORMULA

In using table, find bore of cylinder, in inches or millimeters in the proper left hand column then read across to right under column for the number of cylinders that the motor under considera tion has.

Bore = D		Number of Cylinders = N		Bore = D		Number of Cylinders = N		Bore = D		Number of Cylinders = N	
Inches	Millimeters	4	6	Inches	Millimeters	4	6	Inches	Millimeters	4	6
2½	64	10.00	15.00	3¾	95	22.50	33.75	5	127	40.00	60.00
2⅝	68	11.23	16.85	3⅞	99	24.22	36.32	5⅛	130	42.20	63.20
2¾	70	12.08	18.13	4	102	25.60	38.40	5¼	133	44.20	66.40
2⅞	73	13.37	20.00	4⅛	105	27.20	40.80	5⅜	137	46.34	69.50
3	76	14.40	21.60	4¼	108	29.00	43.50	5½	140	48.48	72.72
3⅛	79	15.64	23.50	4⅜	111	30.65	46.00	5⅝	143	50.80	76.10
3¼	83	16.92	25.39	4½	114	32.40	48.60	5¾	146	53.00	79.50
3⅜	85	18.21	27.30	4⅝	118	34.28	51.41	5⅞	149	55.28	82.88
3½	89	19.61	29.45	4¾	121	36.15	54.20	6	152	57.70	86.64
3⅝	92	21.08	31.57	4⅞	124	38.25	57.21				

Index to Tables and Data appears on Pages 27 to 30.

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PERCENTAGE OF SLIP OF MOTOR CAR DRIVING WHEELS
(Henry Souther)

From Mr. Henry Souther's analysis of the results of tests on tire slips at Brooklands, England, on a level racing track of the best sort, with plain round tread tires inflated as is usual for racing, the percentage of slip of the rear wheels when driving is given in the following table:

0.3	for a	speed	of	40	miles	per	hour.
0.6	"	"	"	50	"	"	"
1.1	"	"	"	60	"	"	"
1.8	"	"	"	70	"	"	"
3.7	"	"	"	80	"	"	"
5.4	"	"	"	90	"	"	"

The driving wheel on the inside, running around a curved track, slips a very little more than the outer wheel as the centrifugal force going around curves reduces the weight on the inner wheel, permitting it to slip more readily than the outer wheel.

FORMULA FOR RATE OF SPEED (*Trego*)

To find the rate of speed of an automobile in miles per hour when the total distance covered and the total running time are known:

Given: Time in minutes and seconds and distance.

Using minutes.

Formula is:

$$\frac{D}{\frac{T}{60}} = MPH$$

Divide the time in minutes and fractions thereof by 60. Then divide the distance by this quotient, disregarding decimal points, and the result will be the average speed in miles per hour for the distance.

Example: 105.5 miles in 113 minutes 30 seconds.

```
60)113.5
   ------
1.89)105.5(55.8 miles per hour.
     945
     ----
     1100
      945
     ----
     1550
     1512
     ----
```

Using seconds,

Formula is:

$$\frac{36}{T \text{ (Time in seconds)}} = MPH.$$

Divide 36 by the time in seconds, the distance being **1 mile.**

Example: 1 mile in 45 seconds—

```
45)36 (80 miles per hour.
   360
```

A FORMULA FOR MEASURING CAR PERFORMANCE

Roadability = A.
B = Bore of engine.
S = Stroke of engine.
N = Number of cylinders.
R = Final gear ratio.
D = Diameter of wheels.
W = Total weight *moved.*

$$\frac{B^2 \times S \times W \times R}{W \times D} = A.$$

Ability figure—good. .00105—for American conditions.
Ability figure—low. .00065—for European conditions.

Index to Tables and Data appears on Pages 27 to 30.

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WIND RESISTANCE

Dating back to the time of Smeaton various formulas have been used for determining the relation between wind pressure and velocity as affecting the stability of buildings and other exposed structures. Smeaton's table, which is largely used at the present day, is as follows:

Miles per Hour	Feet per Second	Pressure per sq. ft. in Pounds	Wind Called
1	1.47	0.005	Hardly perceptible.
2	2.93	0.020	Just perceptible.
3	4.4	0.044	
4	5.87	0.079	
5	7.33	0.123	Gentle pleasant wind.
6	8.8	0.177	
7	10.25	0.241	
8	11.75	0.315	
9	13.2	0.400	
10	14.67	0.492	
12	17.6	0.708	Pleasant brisk gale.
14	20.5	0.964	
15	22.00	1.107	
16	23.45	1.25	
18	26.4	1.55	
20	29.34	1.968	Very brisk.
25	36.67	3.075	
30	44.01	4.429	High wind.
35	51.34	6.027	
40	58.68	7.873	
45	66.01	9.963	Very high storm
50	73.35	12.30	
55	80.7	14.9	
60	88.02	17.71	
66	95.4	20.85	Great storm.
70	102.5	24.1	
75	110.	27.7	Hurricane.
80	117.36	31.49	
100	146.67	49.2	Immense hurricane.

The foregoing table is applicable to automobile work assuming that the machine is moving in still air at the varying rates of speed given in miles per hour. It is generally admitted that the Smeaton formula gives results too high. The formula is $P=0.005\ V^2$. Other and more recent formulas are those of Martin, $P=0.004\ V^2$, and Dines, $P=0.0029\ V^2$. At a rate of speed of 60 miles an hour these formulas give the following results in pounds per square foot: Smeaton, 18; Martin, 14.4; Dines, 10.44.

In the case of pleasure cars the wind resistance at ordinary rates of speed is so low that it does not greatly influence design while in the case of racing machines many ingenious forms of construction have been tried out with a view to the reduction of the loss from this source.

POWER REQUIRED TO OVERCOME WIND RESISTANCE (*Forrest Jones*)

A formula for use in approximating the power required to overcome wind resistance is given as follows:

$$HP=\frac{PA\ (M\ 5{,}280\ |\ 60)}{33{,}000}=0.96\ P.A.M$$

In which HP = Horsepower required to overcome wind resistance
P = Pressure of wind in pounds per square foot.
A = Front area of body in square feet.
M = Speed of car in miles per hour.

Numerical example:

Assuming a car with a front area of 10 square feet and a speed of 60 miles per hour, the power required to overcome this wind resistance will be:

$$HP=\frac{13\times 10\ (60\times 5{,}280\ |\ 60)}{33{,}000}=20.8$$

It is not believed that this formula will hold out for all ranges in speed, nor can it be said with certainty that the front area total will be correctly stated if the areas of all the parts without respect to shape or location are figured in on the same basis. In all probability, the most certain way to ascertain the amount of power required to overcome wind resistance is to take a certain car and with suitable instrument under road conditions measure the power required

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POWER CONSUMED IN MOVING A PLANE SURFACE AT DIFFERENT VELOCITIES IN THE OPEN AIR (*Kempe*)

SPEED IN		Horse-power per Square Foot of Effective Surface	SPEED IN		Horse-power per Square Foot of Effective Surface
Miles per Hour	Feet per Minute		Miles per Hour	Feet per Minute	
10	880	0.013	50	4,400	1.64
15	1,320	0.044	75	6,600	5.54
20	1,760	0.105	100	8,800	13.13
25	2,200	0.205	150	13,200	44.29
30	2,640	0.354	200	17,600	105.00

STRIKING ENERGY OF AUTOMOBILES (*Durand*)

Let W = weight of automobile, measured in pounds.
F = average force over the distance required to bring automobile to rest, measured in pounds.
L = distance over which force is exerted to bring automobile to rest, measured in feet.
V = velocity in feet per second,

Then Energy $= \dfrac{W V^2}{64.4}$ in foot pounds,

$F L$ = measure of destructive work done in stopping the machine.

Then $$F L = \frac{W V^2}{64.4}$$

$$F = \frac{W V^2}{64.4 L}$$

$$L = \frac{W V^2}{64.4 F}$$

Or, otherwise and more generally, let E be any fraction or amount of energy which is lost in overcoming an average resistance F over a distance L.
Then:

$$E = F L$$
$$F = E \div L$$
$$L = E \div F$$

In the actual case of automobile collision, F, as has been carefully noted, is merely a distance average of the force developed. It means simply that there will be as much destructive work done as would correspond to the exhibition of a force F over a distance L. Actually, the destructive work will be made up of parts, each one of which may consist of a very much larger force, acting through such smaller distance as may be needed for the rupture of the part in question.

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DIMENSIONS AND LIFT OF POPPET VALVES FOR A GIVEN SIZE OF OPENING

D = Smaller diameter of valve seat.
d = diameter of piping to which valve opening must correspond.

$$r = \frac{D}{d}$$

FLAT-SEATED VALVES.

For $r = 1$ Lift $= d \times 0.250 = D \times 0.250$.
" $r = 1.25$ " $= d \times 0.200 = D \times 0.160$.
" $r = 1.5$ " $= d \times 0.166 = D \times 0.111$.
" $r = 2$ " $= d \times 0.125 = D \times 0.162$.
" $r = 2.5$ " $= d \times 0.100 = D \times 0.040$.

CONE-SEATED VALVES; 45° ANGLE OF CONE.

For $r = 1$ Lift $= d \times 0.307 = D \times 0.307$.
" $r = 1.25$ " $= d \times 0.256 = D \times 0.205$.
" $r = 1.5$ " $= d \times 0.219 = D \times 0.146$.
" $r = 2$ " $= d \times 0.170 = D \times 0.084$.
" $r = 2.5$ " $= d \times 0.138 = D \times 0.055$.

It will be noted that cone-seated valves require a lift from one-fifth to one-quarter greater than the corresponding flat-seated valves.

The proportions of lift given in connection with flat-seated valves are geometrically correct. It should, however, be borne in mind that flat-seated valves generally introduce a certain amount of wire drawing of the incoming charge. A slight increase over the theoretically correct lifts should consequently be provided. A definite coefficient cannot be given as this will depend considerably upon the valve seat and valve chest design as well as upon the proportions of the fillet between valve stem and valve head. The matter is one of personal intuition by the designer; in the best French designs the extra allowance seldom exceeds 25 per cent. of the theoretical lift. It is well to so arrange the contour of the valve and valve chamber profiles that a minimum of lift be required, as this is favorable to silence in running and to flexibility.

FORMULA FOR PISTON VELOCITY

The ratio of connecting rod length to stroke influences the velocity of the piston and the following will hold: Let,

l = eccentricity of crank (half the stroke);
L = length of connecting rod;
v = linear velocity of crank-pin;
θ = crank angle;
S = piston velocity in feet per minute:
r = ratio;

when,

$$r = \frac{l}{L}$$

and,

$$S = v(\sin\theta \times l/2a \sin 2\theta)$$

In the above expression for the piston velocity, all terms higher than 2θ are neglected because of their small value, which affects the result little, and only makes the formula cumbersome.

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WORK DONE BY CLUTCH AND BRAKES (*C. H. Taylor*)

Energy absorption of the clutch in accelerating a motor vehicle, assuming the ideal condition of uniform acceleration

$$W = \frac{MV\,(2Q - FV)}{2(F - Mg\theta)}$$

and

$$w = Q - \frac{FV}{2}$$

$$f = \frac{MV}{F - Mg\theta}$$

where W = total energy absorbed by clutch in accelerating the mass M from zero to V ft. per second when coupled with a motor developing Q foot-pounds per second; w = energy per second absorbed by clutch under the above conditions $= \frac{W}{f}$ where f = time required for acceleration in seconds. θ = tangent of the grade angle, or the per cent. of grade; F = accelerative force applied by the propelling system; g = gravity = 32.2. Also.

$$W = MV\left(\frac{Q}{F} - \frac{V}{2}\right)$$

here $\theta = o$ and

$$f = \frac{MV}{F}.$$

Energy required to be absorbed by the brakes when stopping a motor vehicle, on the level, from full speed is equal to

$$E = \frac{MV^2 + Mg\theta fV}{2}$$

$$f = \frac{MV}{F - Mg\theta}$$

using the same symbols as for the clutch formula, but applied to retardation instead of acceleration

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FORMULAS FOR CONE CLUTCHES (*C. A. Schaefer*)

H.P. = horse-power transmitted.

N = revolutions of crank-shaft per minute.

r = mean radius of friction cone, in inches.

r_1 = large radius of friction cone, in inches.

r_2 = small radius of friction cone, in inches.

R_1 = outside radius of leather band, in inches.

R_2 = inside radius of leather band, in inches.

v = velocity of a point at distance τ from the center, in feet per minute.

F = tangential force acting at radius τ, in pounds.

Pn = total normal pressure between cone surfaces, in pounds.

Ps = spring pressure, in pounds.

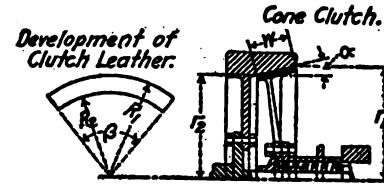
α = angle of clutch surface with axis of shaft = 7 to 13 degrees.

β = included angle of clutch leather, when developed, in degrees.

f = coefficient of friction = 0.20 to 0.25 for greasy leather on iron.

p = allowable pressure per square inch of leather band = 1 to 8 pounds.

W = width of clutch leather, in inches.



$$R_1 = \frac{r_1}{\sin \alpha} \qquad H.P. = \frac{Pn\ f\ r\ N}{63025}$$

$$R_2 = \frac{r_2}{\sin \alpha}$$

Engagement with some slip:

$$\beta = \sin \alpha \times 360 \qquad Pn = \frac{Ps}{\sin \alpha}$$

$$r = \frac{r_1 \times r_2}{2} \qquad Ps = \frac{H.P. \times 63025 \sin \alpha}{f\ r\ N}$$

$$v = \frac{2\pi r N}{12}$$

Engagement without slip:

$$F = \frac{H.P. \times 33000}{v} \qquad Pn = \frac{Ps}{\sin \alpha + f \cos \alpha}$$

$$W = \frac{Pn}{2\ \pi r p}$$

$$Ps = \frac{H.P. \times 63025\ (\sin \alpha + f \cos \alpha)}{f\ r\ N}$$

CO-EFFICIENTS OF FRICTION

The relative value of different materials of construction ascertained as the result of tests made by the National Brake & Clutch Company is tabulated as follows:

Materials	Co-efficient
Metal and cork, Leather and cork, Fibre and cork, on dry metal	0.35
Metal and cork, Leather and cork, Fibre and cork, on oily metal	0.32
Fibre on dry metal	0.27
Fibre on oily metal	0.10
Leather on dry metal	0.23
Leather on oily metal	0.15
Charred leather on oily metal	0.08
Metal on dry metal	0.15
Metal on oily metal	0.07

The co-efficient will vary with the condition of the contacting surfaces. Smooth and unyielding surfaces offer less resistance than rough and yielding ones. In metal to metal contacts different metals are usually employed for the opposing surfaces, as bronze and steel in plate clutches and cast iron and steel in brakes of the shoe type.

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ENERGY CONSUMPTION OF COMMERCIAL VEHICLES (*Churchward*)

The tractive effort of pneumatic tires on hard level asphalt varies from 15 pounds per ton for special tires designed for electric runabouts up to 35 pounds per ton for the standard type used on gasoline touring cars.

The tractive effort of pneumatic tires is also greatly affected by the air pressure increasing rapidly as the air pressure is reduced.

The tractive effort of solid tires on hard level asphalt varies from 18 pounds to 26 pounds per ton, depending upon:

(1) The diameter of driving wheels.
(2) Revolutions per minute.
(3) Load in pounds, per square inch or pounds per inch width.
(4) Composition of the compound used.
(5) Method of attaching tire to wheel rim.

The tractive effort of a vehicle will vary with the road surface as per table, taking the tractive effort of a vehicle on hard level alphalt as unity.

(1) Level asphalt (hard)	1.00
(2) Wood pavement	1.15
(3) Level macadam	1.15 to 3
(4) Plank road	.9
Cobble stones	1.75
(5) Good dirt road	1.10 to 2
(6) Ordinary country road (dirt)	2.
(7) Sand	20 .

The tractive effort due to grades must be added to the tractive effort for a given road surface. Example: 5 per cent. grade on hard level asphalt. Hard level asphalt 25 pounds per ton. 5 per cent. grade = 100 pounds per ton, due to grade alone. 100 + 25 = total tractive effort = 125 pounds per ton, total.

Taking everything into consideration, that is to say, life of engine, transmission, tires and maintenance of vehicle as a whole, experience shows that the following table of economic speeds is approximately correct:

Gross Weight	Type of Tires	Speed in M.P.H.
1,500 lbs.	Pneumatic	20
2,000 "	"	20
3,000 "	"	18
4,000 "	"	16
2,000 "	Solid	16
3,000 "	"	15
4,000 "	"	13
5,000 "	"	11
7,000 "	"	9
10,000 "	"	8
15,000 "	"	7
20,000 "	"	6

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REVOLUTIONS PER MINUTE OF AUTO ROAD WHEELS AT DIFFERENT RATES OF SPEED

Miles per Hour	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	22	24	26	28	30	35	40
Feet per Minute	88	176	264	352	440	528	616	704	792	880	968	1,056	1,144	1,232	1,320	1,418	1,496	1,584	1,672	1,760	1,936	2,112	2,288	2,464	2,640	3,080	3,520
WHEEL DIAMETERS 12	28	56	84	112	140	168	196	224	252	280	308	336	364	392	420	448	476	504	532	560	616	672	728	784	840	980	1,120
14	24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480	528	576	624	672	720	840	960
16	21	42	63	84	105	126	147	168	189	210	231	252	273	294	315	336	357	378	399	420	462	504	546	588	630	735	840
18	18.6	37.33	56	72.66	93.33	112	130.66	145.33	168	186.66	203.33	224	242.66	161.33	280	298.66	317.33	336	354.66	373.33	410.66	448	485.33	522.66	560	653.33	746.66
20	16.8	32.6	50.4	67.2	84	100.8	117.6	134.4	151.2	168	184.8	201.6	218.4	235.2	252	268.8	285.6	302.4	319.2	336	369.6	403.2	436.8	470.4	504	588	672
22	15.27	30.54	45.81	61.09	76.36	91.63	106.90	122.18	137.45	152.72	168	183.27	198.54	213.81	229.09	244.36	259.63	274.90	290.18	305.45	336	366.54	397.09	427.63	458.18	534.54	611.09
24	14	28	42	56	70	84	98	112	126	140	154	168	182	196	210	224	238	252	266	280	308	336	364	392	420	490	560
26	12.92	21.84	38.76	51.69	63.61	77.53	90.46	103.38	116.30	129.23	142.15	155.07	168	180.92	193.84	206.76	219.69	232.61	245.53	258.46	284.30	310.15	336	361.84	397.69	452.30	516.92
28	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	264	288	312	336	360	420	480
30	11.2	22.4	33.6	44.8	56	67.2	78.4	89.6	100.8	112	123.2	134.4	145.6	156.8	168	179.2	190.4	201.6	212.8	224	246.4	268.8	291.2	313.6	336	392	448
32	10.5	21	31.5	42	52.5	63	73.5	84	94.5	105	115.5	126	136.5	147	157.5	168	178.5	189	199.5	210	231	252	273	294	315	367.5	420
34	9.88	19.70	29.64	39.52	49.41	59.29	69.17	79.05	88.94	98.82	108.70	118.58	128.47	138.35	148.23	158.11	168	177.88	187.76	197.64	217.41	237	256.94	276.70	296.47	345.88	395.29
36	9.33	18.66	28	37.33	46.66	56	65.33	74.66	84	93.33	102.66	112	121.33	130.66	140	149.33	158.66	168	177.33	186.66	205.33	224	242.66	261.33	280	326.66	373.33
38	8.8	17.68	26.52	35.36	44.21	53.05	61.89	70.73	79.57	88.42	97.27	106.10	114.94	123.78	132.63	141.47	150.31	159.15	168	176.84	194.52	212.21	238.89	247.57	265.26	309.21	353.42
40	8.4	16.8	25.2	33.6	42	50.4	58.8	67.2	75.6	84	92.4	100.8	109.2	117.6	126	134.4	142.8	151.2	159.6	168	184.8	201.6	218.4	235.2	252	294	336
42	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	176	192	208	224	240	280	320
44	7.63	15.27	22.10	30.54	38.18	45.81	53.45	61.09	68.72	76.36	84	91.63	99.24	106.10	114.54	122.18	129.81	137.45	145.09	156.72	168	183.27	198.54	213.81	229.09	267.27	305.45

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RATE OF SPEED IN MILES PER HOUR FOR ELAPSED TIME OVER THE MEASURED MILE FROM ONE TO THREE MINUTES

Time Over Measured Mile		Rate of Speed in Miles per Hour	Time Over Measured Mile		Rate of Speed in Miles per Hour	Time Over Measured Mile		Rate of Speed in Miles per Hour
Min.	*Sec.*		*Min.*	*Sec.*		*Min.*	*Sec.*	
1	0	60.00	1	27	41.38	1	54	31.58
1	1	59.00	1	28	40.91	1	55	31.30
1	2	58.06	1	29	40.45	1	56	31.03
1	3	57.14	1	30	40.00	1	57	30.77
1	4	56.25	1	31	39.56	1	58	30.50
1	5	55.38	1	32	39.13	1	59	30.25
1	6	54.54	1	33	38.71	2	0	30.00
1	7	53.73	1	34	38.29	2	3	29.26
1	8	52.94	1	35	37.89	2	6	28.57
1	9	52.17	1	36	37.50	2	9	27.90
1	10	51.42	1	37	37.11	2	12	27.27
1	11	50.70	1	38	36.73	2	15	26.66
1	12	50.00	1	39	36.36	2	18	26.08
1	13	49.31	1	40	36.00	2	21	25.53
1	14	48.65	1	41	35.64	2	24	25.00
1	15	48.00	1	42	35.29	2	27	24.49
1	16	47.37	1	43	34.95	2	30	24.00
1	17	46.75	1	44	34.61	2	33	23.53
1	18	46.15	1	45	34.28	2	36	23.07
1	19	45.57	1	46	33.96	2	39	22.64
1	20	45.00	1	47	33.64	2	42	22.22
1	21	44.44	1	48	33.33	2	45	21.81
1	22	43.90	1	49	33.03	2	48	21.42
1	23	43.37	1	50	32.72	2	51	21.05
1	24	42.85	1	51	32.43	2	54	20.69
1	25	42.35	1	52	32.14	3	0	20.00
1	26	41.86	1	53	31.86	..	..	.....

SPEED FORMULA

To reduce *A* miles in *B* seconds to miles per hour,

$$A \times \frac{3600}{B} = \text{miles per hour.}$$

SPEED EQUIVALENTS IN AMERICAN AND FRENCH MEASUREMENTS

1 mile per hour = 88 ft. per minute.
= 1.46 ft. per second.
= 27.8 metres per minute.
= 0.463 metre per second.
(1 km. per hour = 0.624 miles per hour.
= 54.9 ft. per minute.
= 0.914 metre per second.

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REFERENCE TABLE SHOWING EQUIVALENT SPEED IN MILES AND KILOMETERS PER HOUR FOR ELAPSED TIME OVER THE MEASURED MILE OR MEASURED KILOMETER FROM 24 SECONDS PROGRESSIVELY BY 1-5 SECOND TO 59 4-5 SECONDS

Time for One Mile. m. s.	Equal to miles per hour.	Equal to Kilometres. per hour.	Time of one Kilometre m. s.	Equal to Kilometres. per hour.	Equal to miles per hour.	Time for One Mile. m. s.	Equal to miles per hour.	Equal to Kilo metres per hour.	Time of one Kilometre m. s.	Equal to Kilometres per hour.	Equal to miles per hour.
24	150.00	241.54	24	150.00	93.15	35	102.85	165.62	35	102.85	63.87
1/5	148.76	239.55	1/5	148.76	92.38	1/5	102.27	164.68	1/5	102.27	63.51
2/5	147.54	237.58	2/5	147.54	91.62	2/5	101.69	163.75	2/5	101.69	63.15
3/5	146.34	235.65	3/5	146.34	90.87	3/5	101.12	162.83	3/5	101.12	62.79
4/5	145.16	233.75	4/5	145.16	90.14	4/5	100.56	161.93	4/5	100.56	62.44
25	144.00	231.88	25	144.00	89.42	36	100.00	161.03	36	100.00	62.10
1/5	142.86	230.05	1/5	142.86	88.71	1/5	99.44	160.13	1/5	99.44	61.75
2/5	141.73	228.23	2/5	141.73	88.01	2/5	98.90	159.26	2/5	98.90	61.41
3/5	140.62	226.44	3/5	140.62	87.32	3/5	98.36	158.39	3/5	98.36	61.08
4/5	139.53	224.67	4/5	139.53	86.64	4/5	97.82	157.52	4/5	97.82	60.74
26	138.46	222.96	26	138.46	85.98	37	97.29	156.67	37	97.29	60.41
1/5	137.40	221.25	1/5	137.40	85.32	1/5	96.77	155.83	1/5	96.77	60.09
2/5	136.36	219.58	2/5	136.36	84.68	2/5	96.25	155.00	2/5	96.25	59.77
3/5	135.34	217.94	3/5	135.34	84.04	3/5	95.74	154.17	3/5	95.74	59.45
4/5	134.33	216.31	4/5	134.33	83.42	4/5	95.23	153.34	4/5	95.23	59.13
27	133.33	214.70	27	133.33	82.80	38	94.73	152.55	38	94.73	58.82
1/5	132.25	213.12	1/5	132.35	82.19	1/5	94.24	151.75	1/5	94.24	58.52
2/5	131.38	211.56	2/5	131.38	81.58	2/5	93.75	150.96	2/5	93.75	58.22
3/5	130.43	210.03	3/5	130.43	80.10	3/5	93.26	150.17	3/5	93.26	57.91
4/5	129.50	208.53	4/5	129.50	80.42	4/5	92.78	149.40	4/5	92.78	57.61
28	128.57	207.03	28	128.57	79.84	39	92.30	148.64	39	92.30	57.32
1/5	127.66	205.57	1/5	127.66	79.27	1/5	91.83	147.87	1/5	91.83	57.02
2/5	126.76	204.12	2/5	126.76	78.71	2/5	91.37	147.13	2/5	91.37	56.74
3/5	125.87	202.69	3/5	125.87	78.16	3/5	90.91	146.39	3/5	90.91	56.45
4/5	125.00	201.29	4/5	125.00	77.62	4/5	90.45	145.65	4/5	90.45	56.17
29	124.13	199.88	29	124.13	77.08	40	90.00	144.92	40	90.00	55.89
1/5	123.28	198.52	1/5	123.28	76.55	1/5	89.55	144.20	1/5	89.55	55.61
2/5	122.45	197.18	2/5	122.45	76.04	2/5	89.11	143.49	2/5	89.11	55.33
3/5	121.62	195.84	3/5	121.62	75.52	3/5	88.67	142.78	3/5	88.67	55.06
4/5	120.80	194.52	4/5	120.80	75.01	4/5	88.23	142.07	4/5	88.23	54.79
30	120.00	193.23	30	120.00	74.52	41	87.80	141.39	41	87.80	54.52
1/5	119.20	191.95	1/5	119.20	74.02	1/5	87.38	140.70	1/5	87.38	54.26
2/5	118.42	190.69	2/5	118.42	73.54	2/5	86.95	140.01	2/5	86.95	53.99
3/5	117.64	189.43	3/5	117.64	73.05	3/5	86.53	139.34	3/5	86.53	53.73
4/5	116.88	188.21	4/5	116.88	72.58	4/5	86.12	138.68	4/5	86.12	53.48
31	116.13	187.00	31	116.13	72.11	42	85.71	138.02	42	85.71	53.22
1/5	115.38	185.79	1/5	115.38	71.65	1/5	85.30	137.35	1/5	85.30	52.97
2/5	114.65	184.62	2/5	114.65	71.20	2/5	84.90	136.71	2/5	84.90	52.72
3/5	113.90	183.41	3/5	113.90	70.73	3/5	84.50	136.07	3/5	84.50	52.47
4/5	113.21	182.28	4/5	113.21	70.30	4/5	84.11	135.44	4/5	84.11	52.23
32	112.50	181.16	32	112.50	69.86	43	83.72	134.81	43	83.72	51.99
1/5	111.80	180.03	1/5	111.80	69.43	1/5	83.33	134.18	1/5	83.33	51.75
2/5	111.11	178.92	2/5	111.11	69.00	2/5	82.95	133.57	2/5	82.95	51.51
3/5	110.43	177.82	3/5	110.43	68.57	3/5	82.57	132.96	3/5	82.57	51.27
4/5	109.75	176.73	4/5	109.75	68.15	4/5	82.19	132.35	4/5	82.19	51.04
33	109.09	175.67	33	109.09	67.74	44	81.81	131.75	44	81.81	50.80
1/5	108.43	174.60	1/5	108.43	67.33	1/5	81.44	131.14	1/5	81.44	50.57
2/5	107.78	173.56	2/5	107.78	66.93	2/5	81.08	130.56	2/5	81.08	50.35
3/5	107.14	172.53	3/5	107.14	66.53	3/5	80.71	129.96	3/5	80.71	50.12
4/5	106.51	171.51	4/5	106.51	66.14	4/5	80.35	129.38	4/5	80.35	49.89
34	105.88	170.50	34	105.88	65.75	45	80.00	128.82	45	80.00	49.68
1/5	105.26	169.50	1/5	105.26	65.36	1/5	79.64	128.24	1/5	79.64	49.45
2/5	104.65	168.52	2/5	104.65	64.98	2/5	79.29	127.68	2/5	79.29	49.24
3/5	104.04	167.53	3/5	104.04	64.61	3/5	78.94	127.11	3/5	78.94	49.02
4/5	103.45	166.58	4/5	103.45	64.24	4/5	78.60	126.57	4/5	78.60	48.81

(*Continued on page* 578)

Index to Tables and Data appears on **Pages 27 to 30.**

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Time for One Mile. m. s.	Equal to miles per hour.	Equal to Kilometres. per hour.	Time of one Kilometre m. s.	Equal to Kilometres. per hour.	Equal to miles per hour.	Time for One Mile. m. s.	Equal to miles per hour.	Equal to Kilo metres per hour.	Time of one Kilometre m. s.	Equal to Kilometres per hour.	Equal to miles per hour.
46	78.26	126.02	46	78.26	48.60	53	67.92	109.38	53	67.92	42.18
1/5	77.92	125.47	1/5	77.92	48.39	1/5	67.66	108.95	1/5	67.66	42.01
2/5	77.58	124.92	2/5	77.58	48.17	2/5	67.41	108.55	2/5	67.41	41.86
3/5	77.25	124.39	3/5	77.25	47.97	3/5	67.16	108.14	3/5	67.16	41.70
4/5	76.92	123.86	4/5	76.92	47.76	4/5	66.91	107.74	4/5	66.91	41.55
47	76.59	123.34	47	76.59	47.56	54	66.66	107.34	54	66.66	41.39
1/5	76.27	122.81	1/5	76.27	47.36	1/5	66.42	106.95	1/5	66.42	41.24
2/5	75.95	122.30	2/5	75.95	47.16	2/5	66.17	106.55	2/5	66.17	41.09
3/5	75.63	121.78	3/5	75.63	46.96	3/5	65.93	106.16	3/5	65.93	40.94
4/5	75.31	121.27	4/5	75.31	46.76	4/5	65.69	105.78	4/5	65.69	40.79
48	75.00	120.77	48	75.00	46.57	55	65.45	105.40	55	65.45	40.64
1/5	74.68	120.25	1/5	74.68	46.37	1/5	65.21	105.00	1/5	65.21	40.49
2/5	74.38	119.77	2/5	74.38	46.19	2/5	64.98	104.63	2/5	64.98	40.35
3/5	74.07	119.27	3/5	74.07	46.00	3/5	64.74	104.25	3/5	64.74	40.20
4/5	73.77	118.79	4/5	73.77	45.81	4/5	64.51	103.88	4/5	64.51	40.06
49	73.47	118.30	49	73.47	45.62	56	64.28	103.52	56	64.28	39.92
1/5	73.17	117.82	1/5	73.17	45.44	1/5	64.05	103.14	1/5	64.05	39.77
2/5	72.87	117.34	2/5	72.87	45.25	2/5	63.83	102.78	2/5	63.83	39.64
3/5	72.58	116.87	3/5	72.58	45.07	3/5	63.60	102.41	3/5	63.60	39.49
4/5	72.29	116.40	4/5	72.29	44.89	4/5	63.38	102.06	4/5	63.38	39.36
50	72.00	115.94	50	72.00	44.71	57	63.16	101.70	57	63.16	39.22
1/5	71.71	115.47	1/5	71.71	44.53	1/5	62.93	101.33	1/5	62.93	39.08
2/5	71.42	115.00	2/5	71.42	44.35	2/5	62.71	100.98	2/5	62.71	38.94
3/5	71.14	114.55	3/5	71.14	44.18	3/5	62.50	100.64	3/5	62.50	38.81
4/5	70.86	114.10	4/5	70.86	44.00	4/5	62.28	100.29	4/5	62.28	38.67
[illegible]	70.58	113.67	51	70.58	43.83	58	62.07	99.95	58	62.07	38.54
1/5	70.31	113.22	1/5	70.31	43.66	1/5	61.85	99.59	1/5	61.85	38.41
2/5	70.04	112.78	2/5	70.04	43.49	2/5	61.64	99.25	2/5	61.64	38.28
3/5	69.76	112.33	3/5	69.76	43.32	3/5	61.43	98.92	3/5	61.43	38.15
4/5	69.49	111.90	4/5	69.49	43.15	4/5	61.22	98.58	4/5	61.22	38.01
[illegible]2	69.23	111.48	52	69.23	42.99	59	61.01	98.24	59	61.01	37.88
1/5	68.96	111.04	1/5	68.96	42.82	1/5	60.81	97.92	1/5	60.81	37.76
2/5	68.70	110.62	2/5	68.70	42.66	2/5	60.60	97.58	2/5	60.60	37.63
3/5	68.44	110.21	3/5	68.44	42.50	3/5	60.40	97.26	3/5	60.40	37.51
4/5	68.18	109.79	4/5	68.18	42.34	4/5	60.20	96.94	4/5	60.20	37.38

REFERENCE TABLE SHOWING EQUIVALENT SPEED IN MILES AND KILOMETERS PER HOUR FOR ELAPSED TIME OVER THE MEASURED MILE OR MEASURED KILOMETER FROM 1 MINUTE TO 30 MINUTES

Time for One Mile. m. s.	Equal to miles per hour.	Equal to Kilometres. per hour.	Time of one Kilometre m. s.	Equal to Kilometres. per hour.	Equal to miles per hour.	Time for One Mile. m. s.	Equal to miles per hour.	Equal to Kilometres per hour.	Time of one Kilometre m. s.	Equal to Kilometres per hour.	Equal to mile per hour.
1 0	60.00	96.61	1 0	60.00	37.26	1 17	46.75	75.28	1 17	46.75	29.03
1 1	59.00	95.00	1 1	59.00	36.64	1 18	46.15	74.31	1 18	46.15	28.66
1 2	58.06	93.49	1 2	58.06	36.05	1 19	45.57	73.38	1 19	45.57	28.30
1 3	57.14	92.01	1 3	57.14	35.48	1 20	45.00	72.46	1 20	45.00	27.94
1 4	56.25	90.58	1 4	56.25	34.93	1 21	44.44	71.56	1 21	44.44	27.60
1 5	55.38	89.17	1 5	55.38	34.39	1 22	43.90	70.69	1 22	43.90	27.26
1 6	54.54	87.82	1 6	54.54	33.87	1 23	43.37	69.84	1 23	43.37	26.93
1 7	53.73	86.52	1 7	53.73	33.36	1 24	42.85	69.00	1 24	42.85	26.61
1 8	52.94	85.25	1 8	52.94	32.87	1 25	42.35	68.19	1 25	42.35	26.30
1 9	52.17	84.01	1 9	52.17	32.40	1 26	41.86	67.40	1 26	41.86	26.00
1 10	51.42	82.80	1 10	51.42	31.93	1 27	41.38	66.63	1 27	41.38	25.7
1 11	50.70	81.64	1 11	50.70	31.48	1 28	40.91	65.87	1 28	40.91	25.40
1 12	50.00	80.51	1 12	50.00	31.05	1 29	40.45	65.13	1 29	40.45	25.10
1 13	49.31	79.40	1 13	49.31	30.62	1 30	40.00	64.41	1 30	40.00	24.84
1 14	48.65	78.34	1 14	48.65	30.21	1 31	39.56	63.70	1 31	39.56	24.56
1 15	48.00	77.29	1 15	48.00	29.81	1 32	39.13	63.01	1 32	39.13	24.30
1 16	47.37	76.28	1 16	47.37	29.41	1 33	38.71	62.33	1 33	38.71	24.04

(*Continued on page* 579)

Index to Tables and Data appears on Pages 27 to 30.

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Time for One Mile. m. s.	Equal to miles per hour.	Equal to Kilometres. per hour.	Time of 1 Kilometre m. s.	Equal to Kilometres. per hour.	Equal to miles per hour.	Time for One Mile. m. s.	Equal to miles per hour.	Equal to Kilometres per hour	Time of 1 Kilometre m. s.	Equal to Kilometres per hour.	Equal to miles per hour.
1 34	38.29	61.66	1 34	38.29	23.77	3 6	19.35	31.16	3 6	19.35	12.01
1 35	37.89	61.01	1 35	37.89	23.53	3 12	18.75	30.19	3 12	18.75	11.64
1 36	37.50	60.38	1 36	37.50	23.29	3 18	18.18	29.27	3 18	18.18	11.29
1 37	37.11	59.76	1 37	37.11	23.04	3 24	17.64	28.40	3 24	17.64	10.95
1 38	36.73	59.14	1 38	36.73	22.81	3 30	17.14	27.60	3 30	17.14	10.64
1 39	36.36	58.55	1 39	36.36	22.58	3 36	16.66	26.82	3 36	16.66	10.34
1 40	36.00	57.97	1 40	36.00	22.35	3 42	16.21	26.10	3 42	16.21	10.06
1 41	35.64	57.39	1 41	35.64	22.13	3 48	15.79	25.42	3 48	15.79	9.80
1 42	35.29	56.82	1 42	35.29	21.91	3 54	15.38	24.76	3 54	15.38	9.55
1 43	34.95	56.28	1 43	34.95	21.70	4 0	15.00	24.15	4 0	15.00	9.31
1 44	34.61	55.73	1 44	34.61	21.50	4 6	14.63	23.56	4 6	14.63	9.08
1 45	34.28	55.20	1 45	34.28	21.28	4 12	14.28	22.99	4 12	14.28	8.86
1 46	33.96	54.68	1 46	33.96	21.09	4 18	13.95	22.46	4 18	13.95	8.66
1 47	33.64	54.17	1 47	33.64	20.89	4 24	13.63	21.95	4 24	13.63	8.46
1 48	33.33	53.67	1 48	33.33	20.70	4 30	13.33	21.46	4 30	13.33	8.28
1 49	33.03	53.19	1 49	33.03	20.51	4 36	13.04	21.00	4 36	13.04	8.10
1 50	32.72	52.69	1 50	32.72	20.32	4 42	12.76	20.54	4 42	12.76	7.92
1 51	32.43	52.22	1 51	32.43	20.14	4 48	12.50	20.13	4 48	12.50	7.76
1 52	32.14	51.75	1 52	32.14	19.96	4 54	12.24	19.71	4 54	12.24	7.60
1 53	31.86	51.30	1 53	31.86	19.78	5 0	12.00	19.32	5 0	12.00	7.45
1 54	31.58	50.85	1 54	31.58	19.61	5.12	11.54	18.58	5 12	11.54	7.16
1 55	31.30	50.40	1 55	31.30	19.43	5 24	11.11	17.89	5 24	11.11	6.90
1 56	31.03	49.96	1 56	31.03	19.27	5 36	10.71	17.24	5 36	10.71	6.65
1 57	30.77	49.55	1 57	30.77	19.11	5 48	10.34	16.65	5 48	10.34	6.42
1 58	30.50	49.11	1 58	30.50	18.94	6 0	10.00	16.10	6 0	10.00	6.21
1 59	30.25	48.71	1 59	30.25	18.78	6 15	9.60	15.46	6 15	9.60	5.96
2 0	30.00	48.30	2 0	30.00	18.63	6 30	9.23	14.86	6 30	9.23	5.73
2 3	29.26	47.11	2 3	29.26	18.17	6 45	8.88	14.30	6 45	8.88	5.51
2 6	28.57	46.00	2 6	28.57	17.74	7 0	8.57	13.80	7 0	8.57	5.32
2 9	27.90	44.92	2 9	27.90	17.32	7 15	8.27	13.31	7 15	8.27	5.13
2 12	27.27	43.91	2 12	27.27	16.93	7 30	8.00	12.88	7 30	8.00	4.97
2 15	26.66	42.93	2 15	26.66	16.55	7 45	7.74	12.46	7 45	7.74	4.80
2 18	26.08	42.00	2 18	26.08	16.20	8 0	7.50	12.08	8 0	7.50	4.66
2 21	25.53	41.11	2 21	25.53	15.85	8 30	7.06	11.37	8 30	7.06	4.38
2 24	25.00	40.25	2 24	25.00	15.52	9 0	6.66	10.72	9 0	6.66	4.13
2 27	24.49	39.43	2 27	24.49	15.21	9 30	6.31	10.16	9 30	6.31	3.92
2 30	24.00	38.64	2 30	24.00	14.90	10 0	6.00	9.66	10 0	6.00	3.72
2 33	23.53	37.89	2 33	23.53	14.61	10 30	5.71	9.19	10 30	5.71	3.54
2 36	23.07	37.15	2 36	23.07	14.32	11 0	5.45	8.77	11 0	5.45	3.38
2 39	22.64	36.45	2 39	22.64	14.06	11 30	5.21	8.39	11 30	5.21	3.23
2 42	22.22	35.78	2 42	22.22	13.80	12 0	5.00	8.05	12 0	5.00	3.10
2 45	21.81	35.12	2 45	21.81	13.54	13 0	4.61	7.42	13 0	4.61	2.86
2 48	21.42	34.49	2 48	21.42	13.31	14 0	4.28	6.89	14 0	4.28	2.66
2 51	21.05	33.89	2 51	21.05	13.07	15 0	4.00	6.44	15 0	4.00	2.48
2 54	20.69	33.31	2 54	20.69	12.85	20 0	3.00	4.83	20 0	3.00	1.86
2 57	20.34	32.75	2 57	20.34	12.63	30 0	2.00	3.22	30 0	2.00	1.24
3 0	20.00	32.20	3 0	20.00	12.42						

SPEED IN MILES PER HOUR WITH DIFFERENT GEAR RATIOS AND ROAD WHEEL SIZES AT R. P. M. OF ENGINE (WITH 3 PER CENT. LOSS ALLOWANCE)

Gears	4:1	3½:1	3:1	2½:1	2:1	1:1
30-in. Wheel....	21.64	24.73	28.86	34.63	43.29	86.57
32 " "	23.09	26.38	30.78	36.94	46.17	92.34
33 " "	23.81	27.21	31.74	38.09	47.62	95.23
34 " "	24.53	28.03	32.70	39.25	49.06	98.12
36 " "	25.98	29.68	34.63	41.55	51.94	103.89
38 " "	27.41	31.33	36.55	43.86	54.83	109.66
40 " "	28.85	32.97	38.37	46.16	57.71	115.41

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HILL-CLIMBING FORMULAS (*Worby Beaumont*)

W = Weight of car and load in pounds.
w = Weight of car and load in tons.
H = Total ascent in feet.
L = Length of hill in feet.
R = Road resistance in pounds per ton weight of car and load.
r = Air resistance in pounds = $V^2 A\ 0.0017$.
V = Velocity of car in feet per second.
A = Area of car in square feet presented to air resistance.
T = Time occupied in ascent in seconds.
E = Efficiency of transmission of power from engine to road wheels.
$HP.$ = Effective horse power of engine.
p = Power given off at road wheels or work done in ascending hill.
S = Speed of ascent in miles per hour.

Then if
P = Mean effective cylinder pressure.
L = Length of stroke in feet.
A = Area of piston in square inches.
N = Number of useful or firing strokes per minute,

the brake horse-power of petrol or steam engines, having a mechanical efficiency of E, is

$$\frac{EPLAN}{33000}$$

For compound steam engines the number of useful working strokes are those occurring in the low-pressure cylinder, and the mean effective pressure in the high-pressure cylinder or cylinders is referred to the area of the low-pressure cylinder.

The power given off at the road wheels during the ascent of the hill is

$$p = \frac{HW + (Rw + r)L}{T\ 550}$$

and the brake horsepower required at the engine with a selected value or E is

$$HP = \frac{HW + (Rw + r)L}{TE\ 550}$$

With the other conditions known, the efficiency may be found from

$$E = \frac{HW + (Rw + r)L}{HP.\ T\ 550}$$

the speed of the aseent in miles per hour from

$$S = \frac{\dfrac{L}{HWL + (Rw + r)}}{HP.\ E\ 550} L \times 1.466$$

and the time occupied in the ascent from

$$T = \frac{HW + (Rw + r)L}{HP.\ E\ 550}$$

Unless the probable speed of the car is high, or the wind velocity such that the pressure upon the surface of the car presented to air resistance opposing motion approaches that due to the speed of the car through still air, then the quantity r may be omitted from the foregoing expressions without introducing more than slight error.

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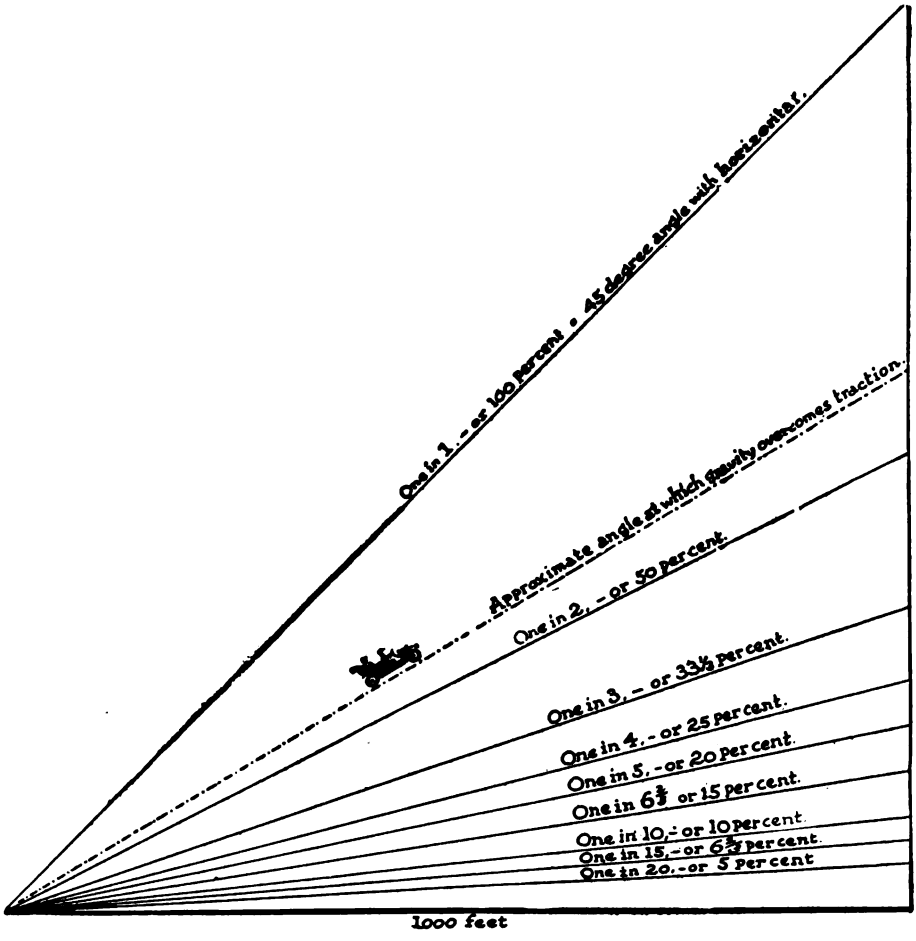
MEASUREMENT OF GRADES



ILLUSTRATING METHOD OF CALCULATING GRADE PERCENTAGES

If it be assumed that the base of the triangle represents a line 1,000 feet long and that the first sloping line represents a road having a rise that brings it 50 feet above the starting point, this is figured as 50 feet in a thousand, or 5 per cent. In other words, one foot of rise for every 20 feet, but the latter distance does not mean distance actually traveled by a car in ascending such a slope, but distance measured horizontally with reference to that slope. The grade is measured by the tangent of the angle of inclination and not by its sine, so that a grade which represents 100 per cent. corresponds to an angle of inclination of but 45 degrees, and not 90 degrees, or perpendicular, as is commonly supposed. At the upper end of the next sloping line the elevation would amount to 66 2/3 feet, which is equivalent to a rise of 6 2/3 feet for each 100 feet traveled horizontally. So one in three corresponds to a 33 1/3 per cent. grade, one in two to a 50 per cent. grade, and so on until a 100 per cent. grade is reached, which, as noted, is the equivalent of a 45 degree angle.

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TABLE OF GRADIENTS

GRADE		Equal to Angle of	Rise or Fall in One Mile, Feet
Per Cent	Units		
20	1 in 5	11° 19′	1056
17	1 " 6	9° 26′	880
14	1 " 7	8° 09′	754
12.5	1 " 8	7° 08′	635
11	1 " 9	6° 17′	586
10	1 " 10	5° 43′	528
9	1 " 11	5° 11′	480
8	1 " 12	4° 46′	440
7.75	1 " 13	4° 24′	406
7	1 " 14	4° 05′	337
6.5	1 " 15	3° 49′	352
6.25	1 " 16	3° 35′	330
6	1 " 17	3° 22′	310
5.5	1 " 18	3° 11′	293
5	1 " 19	3° 00′	277
5	1 " 20	[illegible] 52′	204
4	1 " 25	2° 18′	218
3.3	1 " 30	1° 55′	155
2.8	1 " 35	1° 38′	151
2.5	1 " 40	1° 26′	132

COMPOUND EQUIVALENTS

Atmosphere (14.7 lbs. per square inch) = 1.0335 kilogrammes per square centimetre.
1 Foot-pound = 0.1382 kilogrammetre.
1 lb. per square inch = 0.0703077 kilogramme per square centimetre = 0.7031 gramme per square millimetre = 5.170 centimetres of mercury at 0 degrees Centigrade.
1 Kilogramme per square millimetre = 1422.32 lbs. per square inch = 0.635 ton per square inch.
1 Kilogramme per square centimetre = 14.2232 lbs. per square inch.
1 Gramme per square millimetre = 1.422 lbs. per square inch.
1 Kilogrammetre = 7.233 foot-pounds.
1 Gramme per square centimetre = 0.01422 lb. per square inch.
1 Calorie or French unit of heat = 3.968 British Thermal Units.
French mechanical equivalent of heat (425 kilogrammetres) = 3,074 foot-pounds per unit.
1 Calorie per square metre = 0.369 heat-unit per square foot.
1 Calorie per kilogramme = 1.800 heat-units per lb.
English unit of heat, or heat-unit = 0.252 calorie.
English mechanical equivalent to one heat-unit (778 foot-pounds) = 10.67 kilogrammetres
1 English heat-unit per square foot = 2.713 calories per square metre.
1 English heat-unit per lb. = 5.9 calorie per kilogramme.

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USEFUL ENGINEERING DATA

Gasoline has a specific gravity of .72, and consequently weighs 5.96 pounds per gallon. This applies to 76° gasoline.

A foot-pound represents the work required to raise a weight of one pound to a height of one foot. There are 33,000 foot-pounds to a horsepower.

A British Thermal Unit represents the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit at or near 39° F. Its symbol is B. T. U.

There are 778 foot-pounds in a B. T. U.

There are 42.4 B. T. U. to a horsepower.

The thermal efficiency of a good internal combustion motor is from 30 to 35 per cent.

The mechanical efficiency of a good internal combustion motor should be between 85 and 90 per cent.

On direct drive, with an efficient transmission and differential, about 88 per cent. of the power furnished by the motor should be delivered at the rear wheels

Under the best conditions, about 75 per cent. of the indicated horsepower of the engine should be available for useful work.

If the work performed at the rear wheels is reduced to heat units, it will be found that about 23 per cent. of the energy represented by the heating value of the fuel is available as useful work.

The piston speed of a motor should not exceed 1,000 feet per minute.

The peripheral velocity of a cast iron flywheel should not exceed 5,000 feet per minute Should it exceed this speed, there would be danger of the flywheel bursting from centrifugal force.

USEFUL FUNCTIONS OF π

$\pi = 3.14159265$	$\frac{\pi}{7} = 0.44879895$	$\pi^2 = 9.86960440$	$\sqrt{\pi} = 1.77245385$
$\frac{\pi}{2} = 1.57079633$	$\frac{\pi}{16} = 0.19634954$	$\pi^3 = 31.00627668$	$\sqrt{\pi} = 1.46459189$
$\frac{\pi}{3} = 1.04719755$	$\frac{\pi}{24} = 0.13089969$	$\frac{1}{\pi} = 0.31830989$	$\frac{1}{\sqrt{\pi}} = 0.56418958$
$\frac{\pi}{4} = 0.78539816$	$\frac{\pi}{32} = 0.09817477$	$\frac{1}{\pi^2} = 0.10132118$	$\frac{1}{\sqrt[3]{\pi}} = 0.68278406$
$\frac{\pi}{6} = 0.52359878$	$\frac{\pi}{180} = 0.01754329$	$\frac{1}{\pi^3} = 0.03225153$	$\text{Log } \pi = 0.49714987$

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PROPORTIONS OF ATMOSPHERIC AIR

(1) To find the quantity of nitrogen by volume corresponding to one volume of oxygen, multiply by 3.77092.

(2) To find the quantity of oxygen by volume corresponding to one volume of nitrogen, multiply by 0.265182.

(3) To find the quantity of nitrogen by weight corresponding to one part by weight of oxygen, multiply by 3.313022.

(4) To find the quantity of oxygen by weight corresponding to one part by weight of nitrogen, multiply by 0.301839.

(5) To find the quantity of nitrogen by volume corresponding to one part by weight of oxygen, multiply by 2.6365411.

(6) To find the quantity of oxygen by volume corresponding to one part by weight of nitrogen, multiply by 0.2730071.

(7) To find the quantity of nitrogen by weight corresponding to one part by volume of oxygen, multiply by 3.6629154.

(8) To find the quantity of oxygen by weight corresponding to one part by volume of nitrogen, multiply by 0.3792848.

Formula for correcting the volume of gases for temperature and pressure:

$$\frac{V}{V^1} = \frac{(273+t)P^1}{273+t^1P}.$$

When,

V = original volume;
V^1 = corrected volume;
t = original temperature in degrees Centigrade;
t^1 = final temperature in degrees Centigrade;
P = original pressure;
P^1 = final pressure;
273 = absolute temperature in degrees Centigrade.

Absolute temperature, if measured in Fahrenheit units, instead of in Centigrade as above given, would be 491.13 below the melting point of ice. The volume of a perfect gas increases 1/273 of its volume at 0 degrees Centigrade for every increase of 1 degree on the same scale. According to this, absolute zero corresponds to the temperature at which the same perfect gas would reduce to nothing.

COMBUSTION CONSTANTS OF VARIOUS GASES AND FUELS

	Atomic Weight Hydrogen=1	Molecular Weight H_2 = 2	Specific Gravity at 32° F. and Atmospheric Pressure Water=1	Density in Pounds per Cubic Foot	Specific Heat at Constant Pressure	Specific Heat at Constant Volume	Coefficient of Expansion of Volume at Constant Pressure per Deg. Centigrade	Coefficient of Expansion of Volume at Constant Pressure per Deg. Fahrenheit	British Thermal Units Given Out During Combustion with Oxygen
Air	.....	.....	.00130	.0809	.2377	.1690	.003665	.002036	.....
Carbon	11.97	.....	2.33	.....	.2411	.....	.....	.....	14,540
Carbonic acid gas	.....	CO^2 43.89	.00198	.1225	.2164	.1535	.003688	.002049	.....
Carbonic oxide	.....	CO 27.93	.00126	.0784	.2479	.1758	.003667	.002037	4,370
Coal gas (average)	.....	.....	.00054	.0335	.....	.....	.....	.....	17,800
Hydrogen	1	H_2 – 2	.00009	.0056	3.4046	2.414	.003667	.002037	61,260
Methane	.....	CH_4 15.97	.00072	.0448	.5929	.4701	.....	.....	26,400
Oxygen	15.96	O_2 31.92	.00144	.0896	.2182	.156	.....	.....	.....
Steam at 212° F.	.....	H_2O 17.96	.0008	.05	.4750	.34	.....	.....	.....
Refined petroleum	.....	.....	.8	.....	.....	.....	.....	.....	22,000
Crude petroleum	.....	.....	.9	.....	.....	.....	.....	.....	20,000

Specific heat of gas engine exhaust gases = .258 at constant pressure and .189 at constant volume.

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SPECIFIC HEAT OF HYDROCARBONS

In order to be able to estimate the losses in the exhaust of a motor it is necessary to know the specific heat of the elements and compounds determined by analysis of the exhaust, together with the range of temperatures, as well as the weight of the exhaust gases. The specific heat values are as follows:

Elements and Compounds	Specific Heat
Carbon	0.241
Carbon monoxide	0.2479
Oxygen	0.218
Hydrogen	0.244
Nitrogen (approximately)	0.240

Since over 80 per cent. of the whole weight of gas (mixture) will be nitrogen, it follows that much of the heat lost to the exhaust is taken away in the nitrogen. This fact, coupled with the absence of heat value, in nitrogen, tends to the contention that nitrogen is an evil without a recompense. In the absence of nitrogen, however, the fuel would be so quick-burning that the pistons would not be capable of receding rapidly enough to enable the functions to be performed, and it follows that some element has to be present, the nature of which will serve to dampen the rate of flame propagation. Nitrogen is at hand in the right proportion and the cost of its provision is therefore nil, since, as exemplified above, it has no heat value.

PROPERTIES OF SOME OF THE HYDROCARBONS

Name	Per Cent. of Carbon	Per Cent. of Hydrogen	Boiling Point—Fahr.	Specific Gravity	Vapor Density
Pentane	83.20	16.71	87	.640	2.538
Hexane	83.68	16.32	143	.676	3.053
Heptane	83.90	16.04	165	.718	3.547

PROPERTIES OF GASES

(1*)	(2*)	(3*)	(4*)	(5*)
Hydrogen	H	.0692	.00559	52230
Oxygen	O	1.106	.08921	.....
Nitrogen	N	.971	.07831	.....
Carbon Monoxide	CO	.967	.07807	4380
Carbon Dioxide	CO_2	1.529	.12267	.....
Dry Air	.....	1.000	.08072	.....
Water Vapor	H_2O	.625	.05020	.....
Acetylene	C_2H_2	.915	.07251	20673
Methane	CH_4	.554	.04464	21385
Ethylene	C_2H_2	.974	.07805	20025
Alcohol	C_2H_6O	1.601	.12598	12000

*1 Gases.
*2 Chemical Formula or Symbol.
*3 Density (Air = 1).
*4 Weight per cubic foot under standard conditions.
*5 Heating values per pound in B. T. U.

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TABLE OF ELECTRICAL HORSEPOWER

Amperes

Volts	1	10	20	30	40	50	60	70	80	90	100	110
1	.00134	.0134	.0268	.0402	.0536	.0670	.0804	.0938	.1072	.1206	.1341	.1475
5	.00670	.0670	.1341	.2011	.2681	.3351	.4022	.4692	.5362	.6032	.6703	.7373
10	.01341	.1341	.2681	.4022	.5362	.6703	.8043	.9383	1.072	1.206	1.341	1.475
15	.02011	.2011	.4022	.6032	.8043	1.005	1.206	1.408	1.609	1.810	2.011	2.212
20	.02681	.2681	.5362	.8043	1.072	1.340	1.609	1.877	2.145	2.413	2.681	2.949
25	.03351	.3351	.6703	1.005	1.341	1.676	2.011	2.346	2.681	3.016	3.351	3.686
30	.04022	.4022	.8043	1.206	1.609	2.011	2.413	2.815	3.217	3.619	4.022	4.424
35	.04692	.4692	.9384	1.408	1.877	2.346	2.815	3.284	3.753	4.223	4.692	5.161
40	.05362	.5362	1.072	1.609	2.145	2.681	3.217	3.753	4.290	4.826	5.362	5.898
45	.06032	.6032	1.206	1.810	2.413	3.016	3.619	4.223	4.826	5.439	6.032	6.635
50	.06703	.6703	1.341	2.011	2.681	3.351	4.022	4.692	5.362	6.032	6.703	7.373
75	.10054	1.005	2.011	3.016	4.021	5.027	6.032	7.037	8.043	9.048	10.05	11.06
100	.13405	1.341	2.681	4.022	5.362	6.703	8.043	9.384	10.72	12.06	13.41	14.75
500	.67025	6.703	13.41	20.11	26.81	33.51	40.22	46.92	53.62	60.32	67.03	73.73
1,000	1.3405	13.41	26.81	40.22	53.62	67.03	80.43	93.84	107.2	120.6	134.1	147.5
5,000	6.7025	67.03	134.1	201.1	268.1	335.1	402.2	469.2	536.2	603.2	670.3	737.3
10,000	13.405	134.1	268.1	402.2	536.2	670.3	804.3	938.3	1072.	1206.	1341.	1475.

Rule: $\frac{\text{Volt} \times \text{Ampere}}{746} = \text{H.P.}$

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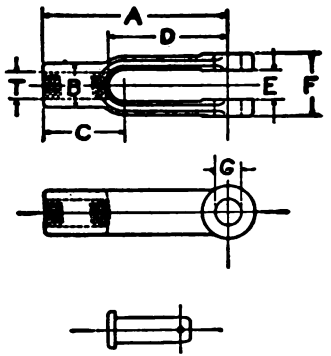
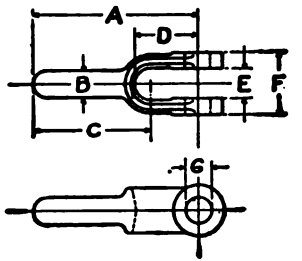
YOKE AND EYE ROD ENDS (*S. A. E. Standard*)

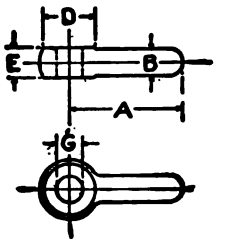
Adjustable Yoke Ends



Plain Yoke Ends



Rod Ends



A	B	C	D	E	F	G	T
1 9/16	5/16	1 1/16	1	3/16	7/16	3/16	3/16 32 U. S.
2	7/16	7/8	1 1/4	9/32	5/8	1/4	1/4 28 A.L.A.M.
2 1/4	1/2	1	1 7/16	11/32	3/4	5/16	5/16 24 A.L.A.M.
2 1/2	5/8	1 1/8	1 5/8	7/16	7/8	3/8	3/8 24 A.L.A.M.
2 7/8	23/32	1 1/4	1 7/8	1/2	1	7/16	7/16 20 A.L.A.M.
3	15/16	1 7/16	1 7/8	9/16	1 1/8	1/2	1/2 20 A.L.A.M.

A	B	C	D	E	F	G
1 1/4	3/16	7/8	7/16	3/16	7/16	3/16
1 3/4	1/4	1 1/4	5/8	9/32	5/8	1/4
2	5/16	1 3/8	3/4	11/32	3/4	5/16
2 1/8	3/8	1 7/16	27/32	7/16	7/8	3/8
2 1/4	7/16	1 1/2	1	1/2	1	7/16
2 1/2	1/2	1 5/8	1 1/8	9/16	1 1/8	1/2

A	B	D	E	G
1 1/4	3/16	3/8	3/16	3/16
1 1/4	1/4	1/2	9/32	1/4
1 3/8	5/16	19/32	11/32	5/16
1 1/2	3/8	11/16	7/16	3/8
1 1/2	7/16	13/16	1/2	7/16
1 3/4	1/2	15/16	9/16	1/2

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LOCK WASHER DIMENSIONS (*S. A. E. Standard*)

The outside diameters of lock washers shall coincide practically with the long diameters of S. A. E. Standard nuts, which are approximately the short diameters of United States Standard nuts.

The inside diameters of the lock washers shall be from 164″ to 132″ larger than bolt diameters.

All lock washers shall be parallel-faced sections; and bulging or malformed ends must be avoided.

Table of Sizes

Automobile Heavy (A. H.)

For General Use

Bolt Diameter	Lock Washer Section	Bolt Diameter	Lock Washer Section
3/16″	1/16″x 1/16″	11/16″	1/4″x 1/4″
1/4″	5/64″x 5/64″	3/4″	1/4″ x 1/4″
5/16″	1/8″ x 1/8″	7/8″	17/64″x17/64″
3/8″	1/8″ x 1/8″	1″	5/16″x 5/16″
7/16″	11/64″x11/64″	1 1/8″	5/16″x 5/16″
1/2″	11/64″x11/64″	1 1/4″	3/8″ x 3/8″
9/16″	13/64″x13/64″	1 3/8″	3/8″ x 3/8″
5/8″	13/64″x13/64″	1 1/2″	7/16″x 7/16″

Automobile Light (A. L.)

For Optional Use Against Soft Metal

Bolt Diameter	Lock Washer Section
3/16″	1/16″x3/64″
1/4″	5/64″x1/16″
5/16″	1/8″ x3/32″
3/8″	1/8″ x3/32″
7/16″	11/64″x1/8″
1/2″	11/64″x1/8″
9/16″	13/64″x5/32″
5/8″	13/64″x5/32″
11/16″	1/4″ x3/16″
3/4″	1/4″ x3/16″
7/8″	17/64″x3/16″
1″	5/16″x1/4″

Test

Temper

After compression to flat, reaction shall be sufficient to indicate necessary spring power, and on a subsequent compression to flat the lock washer shall manifest no appreciable loss in reaction.

Toughness

Forty-five per cent. of the lock washer, including one end, shall be firmly secured in a vise, and forty-five per cent., including the other end, shall be secured firmly between parallel jaws of a wrench. Movement of the wrench at right angle to helical curve shall twist the lock washer through forty-five degrees without sign of fracture; and shall twist the lock washer entirely apart within one hundred and thirty-five degrees.

OVERSIZE CYLINDERS (*S. A. E. Standard*)

There has hitherto existed no uniform practice as to the amount of metal removed in regrinding worn cylinders, with the result that difficulty is experienced in securing new pistons of correct size, from the manufacturers.

With a view to eliminating all unnecessary expense and delay, the following standards have been accepted by the Society:—

Ten Thousandths	(.010″)	inch	large	for	first	oversize	standard
Twenty "	(.020″)	"	"	"	second	"	"
Thirty "	(.030″)	"	"	"	third	"	"
Forty "	(.040″)	"	"	"	fourth	"	"

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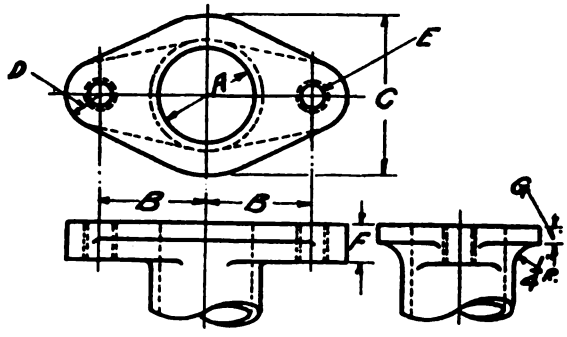
CARBURETER FITTINGS (*S. A. E. Standard*)

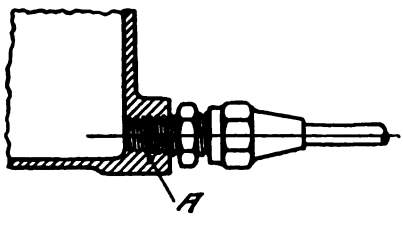
FLANGES



Carbureter Size	A	B	C	D	E *	F	G
3/4	15/16"	1 1/16"	1 5/8"	11/32"	5/16"x18 thr.	3/8"	1/8"
7/8	1 1/16"	1 1/8"	1 3/4"	11/32"	5/16"x18 thr.	3/8"	1/8"
1	1 3/16"	1 3/16"	1 7/8"	11/32"	5/16"x18 thr.	13/32"	5/32"
1 1/4	1 7/16"	1 11/32"	2 3/16"	13/32"	3/8" x16 thr.	15/32"	3/16"
1 1/2	1 11/16"	1 15/32"	2 1/2"	13/32"	3/8" x16 thr.	15/32"	3/16"
1 3/4	1 15/16"	1 21/32"	2 13/16"	15/32"	7/16"x14 thr.	9/16"	7/32"
2	2 3/16"	1 25/32"	3 1/8"	15/32"	7/16"x14 thr.	9/16"	7/32"

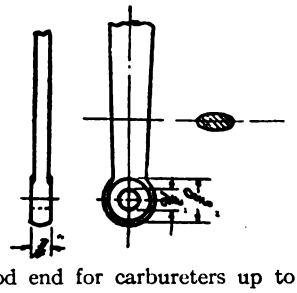
*U. S. Standard thread.
All dimensions in inches.

GASOLINE PIPE SIZES

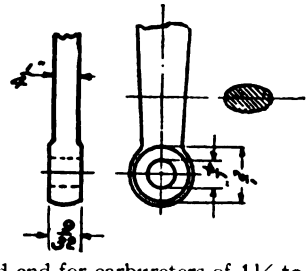


Carbureter Size	A, Briggs Standard. Pipe Thread
3/4"	1/8"
7/8"	1/8"
1"	1/8"
1 1/4"	1/4"
1 1/2"	1/4"
1 3/4"	1/4"
2"	1/4"

THROTTLE LEVERS



3/16" Rod end for carbureters up to 1 inch



1/4" Rod end for carbureters of 1 1/4 to 2 inches inclusive

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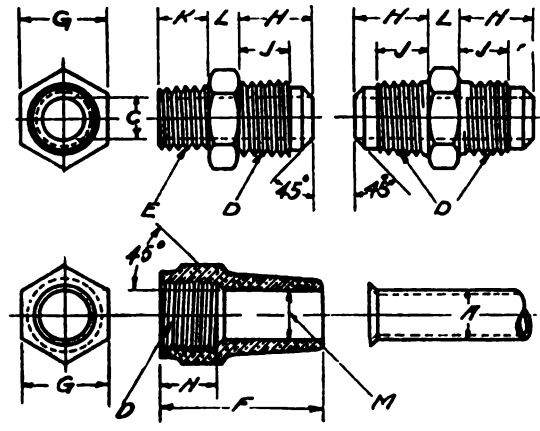
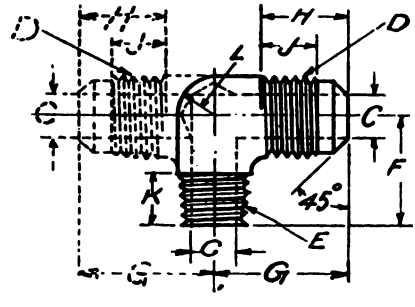
CARBURETER FITTINGS (*S. A. E. Standard*) (*Continued*)

FLARED TUBE UNIONS



A	Pipe diameter.....	1/4	5/16	3/8	7/16	1/2
C	Bore, male part.....	3/16	7/32	9/32	5/16	13/32
D	S. A. E. thread.....	7/16x20 thr.	1/2x20 thr.	5/8x18 thr.	11/16x16 thr.	3/4x16 thr.
E	Pipe thread.....	1/8	1/8	1/4	1/4	3/8
F	.....	15/16	1 1/8	1 5/16	1 1/2	1 5/8
G	.....	9/16	5/8	3/4	13/16	7/8
H	.....	1/2	9/16	5/8	11/16	3/4
J	Thread only.....	11/32	3/8	13/32	7/16	1/2
K	Thread only.....	3/8	3/8	7/16	7/16	1/2
L	.....	3/16	7/32	1/4	9/32	5/16
M	Bore, female part.....	0.255–0.257	0.317–0.319	0.380–0.382	0.442–0.444	0.505–0.507
N	.....	11/32	3/8	7/16	1/2	9/16

FLARED TUBE ELLS AND TEES



A	Tube diameter.....	1/4	5/16	3/8	7/16	1/2
C	Drill diameter.....	3/16	7/32	9/32	5/16	13/32
D	S. A. E. thread.....	7/16x20	1/2x20	5/8x18	11/16x16	3/4x16
E	Briggs std. pipe thread..	1/8	1/8	1/4	1/4	3/8
F	Center to face.....	3/4	3/4	7/8	15/16	1
G	Center to face.....	7/8	15/16	1	1 1/8	1 3/16
H	.....	1/2	9/16	5/8	11/16	3/4
J	Thread only.....	11/32	3/8	13/32	7/16	1/2
K	Thread only.....	3/8	3/8	7/16	7/16	1/2
L	Radius.....	1/8	1/4	9/32	5/16	11/32

All dimensions on this sheet in inch measure.

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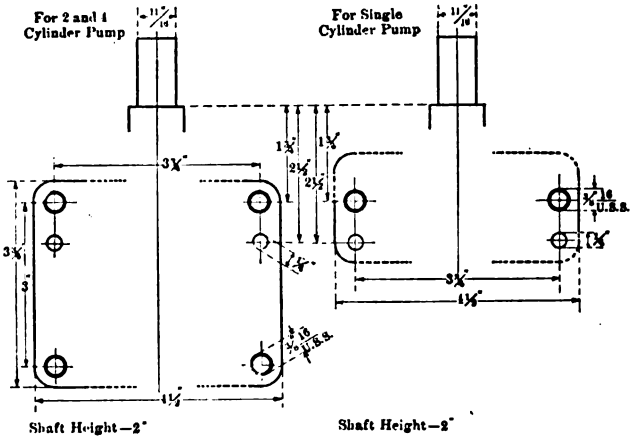
MECHANICALLY DRIVEN AIR PUMP MOUNTING DIMENSIONS

(*S. A. E. Standard*)

Shaft height	2"
Shaft diameter	11/16"
Width of base (right angle to crankshaft)	4 1/2"
Length of base of two and four-cylinder pumps (parallel to crankshaft)	3 3/4"
Distance from center of front baseplate holes to shoulder of shaft	1 3/4"
Distance between centers of baseplate holes:	
At right angle to crankshaft	3 3/4"
Parallel to crankshaft	3"
Baseplate hole thread	3/8-16 U. S. S.
Dowels, two	1/4"

3¾" c to c, placed between pair of baseplate holes located on each side of crankshaft, and on a line 2½" from shoulder of shaft.



MAGNETO MOUNTING DIMENSIONS (*S. A. E. Standard*)

For Four- and Six-Cylinder Engines

	Mm.	Inches
Shaft height	45.	1.771
Distance from center of front base-plate holes to large end of shaft taper	53.	2.086
Distance from center of front base-plate holes to center of rear base-plate holes	50.	1.968
Distance between centers of base-plate holes left to right	50.	1.968
Large diameter of taper	15.	0.590
Small diameter of taper	12.	0.472
Length of taper	15.	0.590
Taper 1:5 (included angle) 11 deg. 30 min. approx. Woodruff key No. 3		
Height of magneto space	203.	8.000
Length of magneto space	254.	10.000
Width of magneto space	127.	5.000
Plain hole timing lever	6.35	0.25
Tapped hole timing lever, ¼ in. 28 P., S.A.E.		
Base-plate holes—⅜ in. 16 P., U.S.S.		
Thread for end of magneto shaft ⅜ in., 16 P., U.S.S., length of thread 0.5905 in.		
Advance lever radius	2.125 in.	

Index to Tables and Data appears on Pages 27 to 30.

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WHEEL DIMENSIONS FOR SOLID TIRES (*S. A. E. Standard*)

Demountable and Non-demountable Rims

SINGLE TIRES

Width of felloe and band.....¾-inch less than sectional size of tire.
Thickness of steel band.....¼-inch up to 4½-inch tire; ⅜-inch on 4½-inch and larger tires.

DUAL TIRES

Width of felloe and band.....Twice the sectional size of tire.
Thickness of steel band.....⅜-inch for all sizes of tire.

SINGLE AND DUAL TIRES

Sectionl size of tire.....	2	2½	3	3½	4
Minimum felloe thickness.....	1¼	1¼	1½	1½	1¾
					6½
Sectional size of tire.....	4½	5	5½	6	and over
Minimum felloe thickness.....	1¾	2	2	2	2⅛

WHEEL DIAMETER OVER STEEL BAND

Single and Dual Tires

Nom. outer diam. of tires	30	32	34	36	38	40	42
Wheel diam. over steel band.....	24	26	28	30	32	34	36
Exact circumf. over steel band; neglecting tolerance.....	75	25/64	81	11/16	87	31/32	94
	1/4	100	17/32	106	13/16	113	3/32

Allowable Deviation From Precision in Felloe Bands

	Plus	Minus
Tolerance in circumf. of band before application.....	0	1/16″
Tolerance in circumf. of band after application.....	1/16″	1/32″
Tolerance in width of band.....	1/64″	1/64″
Tolerance of thickness of band.....	0.006″	0.006″
Tolerance in radius of band after application.....	1/16″	1/16″

Circumferential deviation from precise figure must be uniform across entire width of band.

Radial deviations must not occur at diametrically opposite points, and there must be no flat spots or kinks in band on finished wheel. Either side of band when laid on a surface plate must not clear more than 1/64″ at any point.

COMMERCIAL CAR WHEEL DATA

Bolt Equipment for Side Flanges

All Bolts to be ½ Inch Diameter

Outside Diameter Tire	Diameter Bolt Hole Circle	Number of Bolts	Outside Diameter Tire	Diameter Bolt Hole Circle	Number of Bolts
26	18½	6, 9 or 18	42	34½	10, 15 or 30
28	20½	do.	44	36½	12, 18 or 36
30	22½	do.	46	38½	do.
32	24½	8, 12 or 24	48	40½	do.
34	26½	do.	50	42½	14, 21 or 42
36	28½	do.	52	44½	do.
38	30½	10, 15 or 30	54	46½	do.
40	32½	do.			

(*Continued on page 593*)

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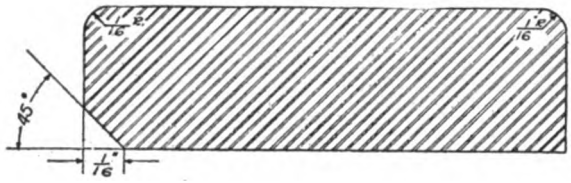
Edges of Felloe Band

Band to be rounded on the two outside edges with radius not to exceed 1/16", and one inside edge to have an angle of about 45 degrees, extending about 1/16" from the edge, as shown in the following sketch:



Measuring Circumference of Band

In measuring circumference of band, if there is not an allowance on the tapeline itself, a correction amounting to three times the thickness of the tapeline should be made.

Note.—*All of the foregoing, so far as pertinent, applies to metal wheels.*

SIZES AND TOLERANCES FOR ANNULAR BALL BEARINGS

(S. A. E. Standard)

Bore Tolerances

The tolerances given include the extremes for all makes of bearings, as endorsed by the ball bearing manufacturers. It has been the practice of some ball bearing manufacturers to work only to minus limits, while others work to tolerances on both sides of exact nominal sizes as to bore.

Where greater accuracy than specified by the tolerances given above is required, the same should be specified.

Definition of Eccentricity

The eccentricity of the inner race is that lack of running truth noticed upon the stationary outer race when rotating the inner race and balls upon true centers.

The eccentricity of the outer race is that lack of running truth shown upon a suitable indicator during the rotation of the outer race and balls upon the inner race fixed upon a stationary arbor.

Axial Freedom

In the absence of a standard method of measuring axial freedom, no definite figures for same have been accepted.

Short Type Roller Bearings

For short type roller bearings, whether plain or taper, the same sizes of bore and outside diameter as for annular ball bearings are standard.

Length of Long Ball and Roller Bearings

No effort is considered advisable at the present time to standardize the length of the so-called long ball or roller bearings.

(Tables of Sizes and Tolerances on pages 594, 603 and 604.)

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SIZES AND TOLERANCES FOR ANNULAR BALL BEARINGS (*S. A. E. Standard*)

LIGHT SERIES

B'g. No.	Bore M.M.	Bore Inches	Bore Tolerance in Inches Plus	Bore Tolerance in Inches Minus	Diameter M.M.	Diameter Inches	Diameter Tolerance in Inches Plus	Diameter Tolerance in Inches Minus	Width M.M.	Width Inches	Width Tolerance in Inches (for both races) Plus	Width Tolerance in Inches (for both races) Minus	Corners of the Outer Race and at Bore of* Inner Race M.M.	Corners of the Outer Race and at Bore of* Inner Race Inches	Eccentricity Tolerance in Inches Inner Race	Eccentricity Tolerance in Inches Outer Race
200	10	0.39370	0.0002	0.0004	30	1.18110	0	0.0006	9	0.35433	0	0.002	1	0.04	0.0008	0.0012
201	12	0.47244	0.0002	0.0004	32	1.25984	0	0.0006	10	0.39370	0	0.002	1	0.04	0.0008	0.0012
202	15	0.59055	0.0002	0.0004	35	1.37795	0	0.0006	11	0.43307	0	0.002	1	0.04	0.0008	0.0012
203	17	0.66929	0.0002	0.0004	40	1.57481	0	0.0006	12	0.47244	0	0.002	1	0.04	0.0008	0.0012
204	20	0.78740	0.0002	0.0004	47	1.85040	0	0.0006	14	0.55118	0	0.002	1	0.04	0.0008	0.0012
205	25	0.98425	0.0002	0.0006	52	2.04725	0	0.0008	15	0.59055	0	0.002	1	0.04	0.0008	0.0012
206	30	1.18110	0.0002	0.0006	62	2.44095	0	0.0008	16	0.62992	0	0.002	1	0.04	0.0008	0.0012
207	35	1.37795	0.0002	0.0006	72	2.83465	0	0.0008	17	0.66929	0	0.002	1	0.04	0.0008	0.0012
208	40	1.57481	0.0002	0.0006	80	3.14962	0	0.0008	18	0.70866	0	0.002	2	0.08	0.0008	0.0012
209	45	1.77166	0.0002	0.0006	85	3.34647	0	0.0008	19	0.74803	0	0.002	2	0.08	0.0010	0.0016
210	50	1.96851	0.0002	0.0006	90	3.54332	0	0.0008	20	0.78740	0	0.002	2	0.08	0.0010	0.0016
211	55	2.16536	0.0002	0.0006	100	3.93702	0	0.0008	21	0.82677	0	0.002	2	0.08	0.0010	0.0016
212	60	2.36221	0.0002	0.0006	110	4.33072	0	0.0008	22	0.86614	0	0.002	2	0.08	0.0010	0.0016
213	65	2.55906	0.0002	0.0006	120	4.72443	0	0.0008	23	0.90551	0	0.002	2	0.08	0.0010	0.0016
214	70	2.75591	0.0002	0.0006	125	4.92128	0	0.0008	24	0.94488	0	0.002	2	0.08	0.0010	0.0016
215	75	2.95277	0.0002	0.0006	130	5.11813	0	0.0008	25	0.98425	0	0.002	2	0.08	0.0010	0.0016
216	80	3.14962	0.0002	0.0006	140	5.51183	0	0.0008	26	1.02362	0	0.002	3	0.12	0.0012	0.0018
217	85	3.34647	0.0002	0.0007	150	5.90554	0	0.0012	28	1.10236	0	0.002	3	0.12	0.0012	0.0018
218	90	3.54332	0.0002	0.0007	160	6.29924	0	0.0012	30	1.18110	0	0.002	3	0.12	0.0012	0.0018
219	95	3.74017	0.0002	0.0007	170	6.69294	0	0.0012	32	1.25984	0	0.002	3	0.12	0.0012	0.0018
220	100	3.93702	0.0002	0.0007	180	7.08664	0	0.0012	34	1.33858	0	0.002	3	0.12	0.0012	0.0018
221	105	4.13387	0.0002	0.0007	190	7.48035	0	0.0012	36	1.41732	0	0.002	3	0.12	0.0012	0.0018
222	110	4.33072	0.0002	0.0007	200	7.87405	0	0.0012	38	1.49607	0	0.002	3	0.12	0.0012	0.0018

*A chamfer of 45 degrees ground true with the bore and outside diameter, is recommended.

(*Continued on page* 603)

Index to Tables and Data appears on Pages 27 to 30.

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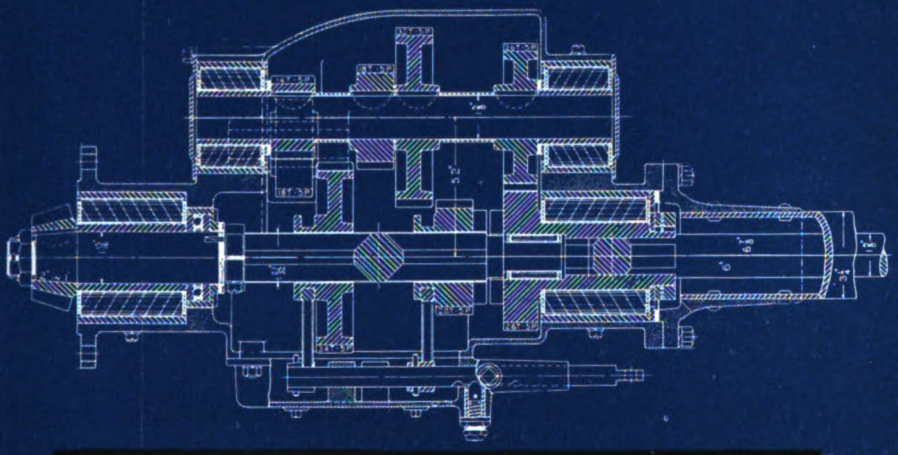
COVERT



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Manufacturers who realize this fact, add to the reliability and service value of their cars, at the same time cutting down production expense, by adopting the Covert Transmission.

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COVERT MOTOR VEHICLE CO.
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These bolts are made of selected steel, specially heat treated, ground and finished.

They are supplied with neat, compact grease cups which force the grease through large ducts, keeping the entire surface of the bolt well lubricated.

We furnish these bolts complete, as shown herewith, or will furnish the body only.

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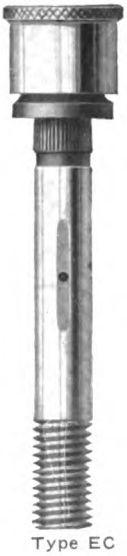
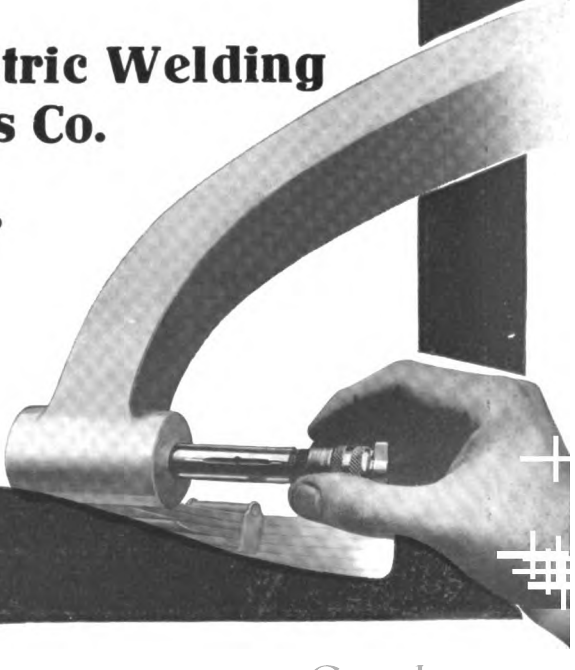


Type EC

The Electric Welding Products Co.

Cleveland, Ohio



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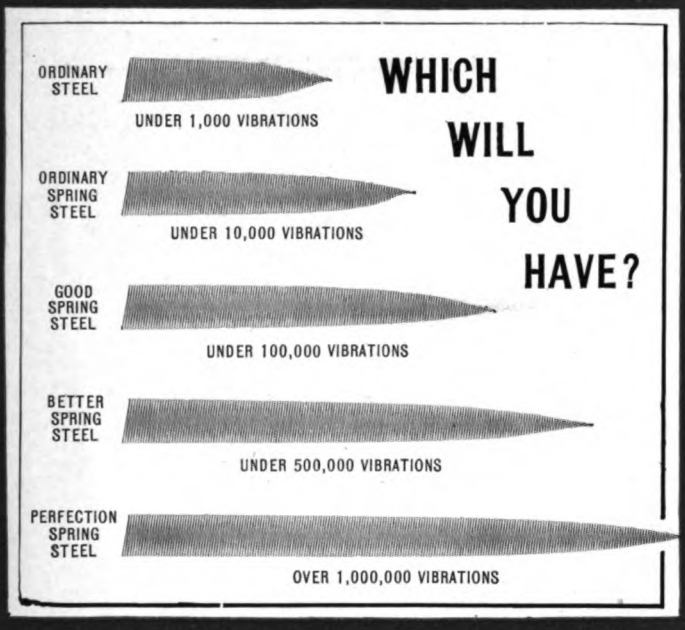

WE extend to all, customers or not, the use of our chemical and physical laboratory, to help them solve their spring problems, just as we were enabled to solve our spring problems. The laboratory is modern and complete. Not a single necessary instrument, device or fitting will be found missing.

WE invite our customers and our friends in the spring-making business to come and see our plants; see how we make springs, observe of the ways that will benefit them if they are desirous of making the best kind of springs or, of making the most efficient use of their springs.

The

Perfection Spring Company

Central Avenue and Sixty-fifth Street

Cleveland, O.

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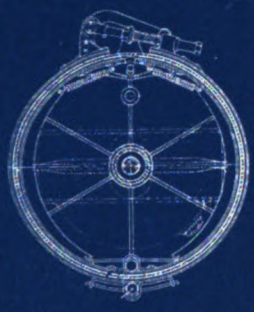
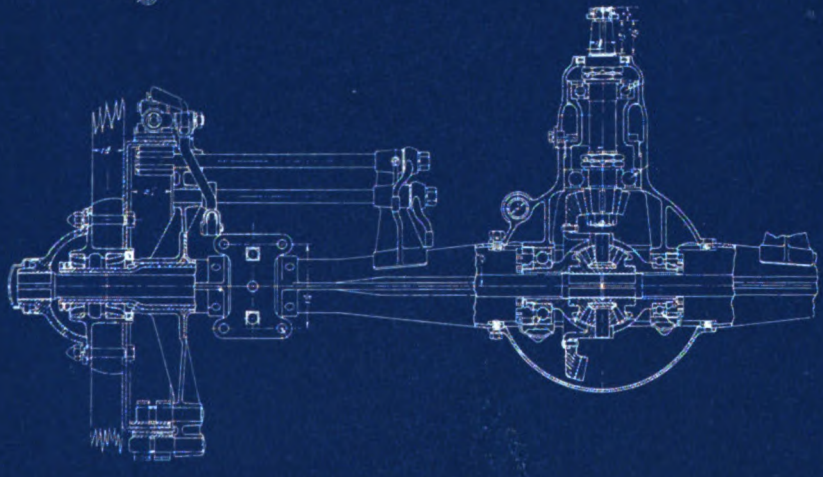


SALISBURY AXLE'S



OUR rear axles are of the full and ¾ floating type, made up with spiral and straight bevel gears and for high-grade cars. The housings are pressed steel or malleable. First-class design and construction throughout.

We also manufacture automobile wheels, hubs and propellers. Our product is up-to-date in every respect.

All contracts worked out from blue prints.

SALISBURY WHEEL & MFG CO.
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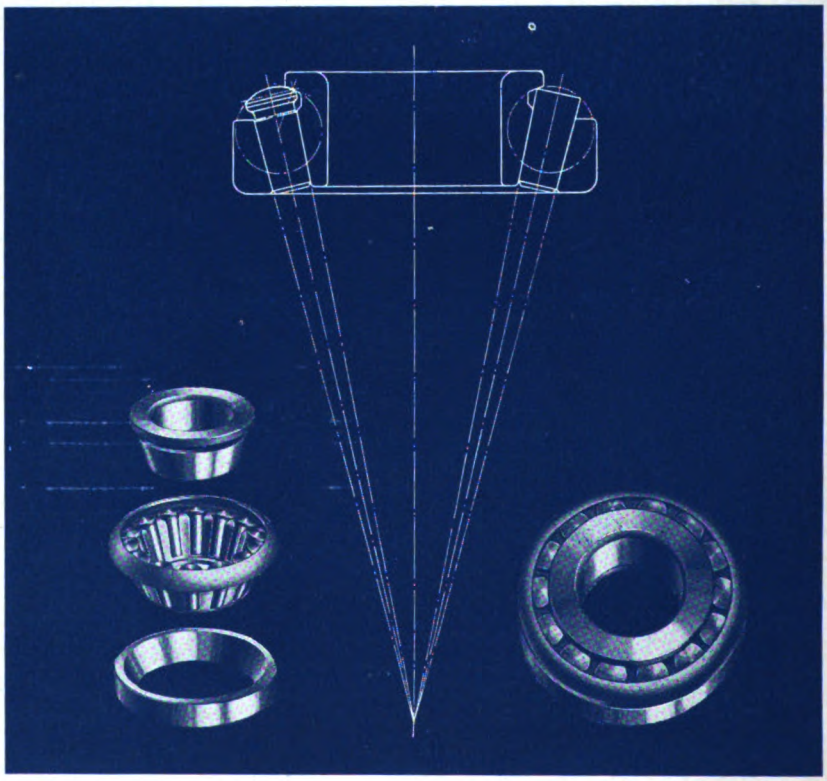
BOCK

TRADE MARK

TAPER ROLLER BEARINGS

AN ALL-AMERICAN PRODUCT



Bock Taper Roller Bearings may look like the conventional type—BUT—in operation there's a wonderful difference.

They were developed solely because no bearing, of any type, could be found to stand up, at high speeds, under certain combined thrust and radial loads.

The Bock has not only met the requirements, but it has gone far beyond all expectations.

THE TAPER ROLLERS

are provided with heads ground to form sections of perfect balls which travel on their special race at points at all times in a direct line with the bearing surface of the rollers.

This original feature makes the BOCK entirely free from the enormous sliding friction which proves so destructive in all other roller bearings.

THE ONLY BEARING successfully combining in one design the advantages of the taper roller and the ball thrust bearing.

THE ONE BEARING sure to withstand the enormous thrust incident to the use of the worm drive or spiral bevel gears.

INTERCHANGEABLE with many sizes of other roller and ball bearings in general use.

Ask for Report of Test No. 26

THE BOCK BEARING CO., Phillips Ave. and M.C.R.R. TOLEDO, OHIO

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SIZES AND TOLERANCES FOR ANNULAR BALL BEARINGS (*S. A. E. Standard*)

MEDIUM SERIES

B'g. No.	Bore M.M.	Bore Inches	Bore Tolerance in Inches Plus	Bore Tolerance in Inches Minus	Diameter M.M.	Diameter Inches	Diameter Tolerance in Inches Plus	Diameter Tolerance in Inches Minus	Width M.M.	Width Inches	Width Tolerance in Inches (for both races) Plus	Width Tolerance in Inches (for both races) Minus	Corners of the Outer Race and at Bore of* Inner Race M.M.	Corners of the Outer Race and at Bore of* Inner Race Inches	Eccentricity Tolerance in Inches Inner Race	Eccentricity Tolerance in Inches Outer Race
300	10	0.39370	0.0002	0.0004	35	1.37795	0	0.0006	11	0.43307	0	0.002	1	0.04	0.0008	0.0012
301	12	0.47244	0.0002	0.0004	37	1.45669	0	0.0006	12	0.47244	0	0.002	1	0.04	0.0008	0.0012
302	15	0.59055	0.0002	0.0004	42	1.65355	0	0.0006	13	0.51181	0	0.002	1	0.04	0.0008	0.0012
303	17	0.66929	0.0002	0.0004	47	1.85040	0	0.0006	14	0.55118	0	0.002	1	0.04	0.0008	0.0012
304	20	0.78740	0.0002	0.0006	52	2.04725	0	0.0008	15	0.59055	0	0.002	1	0.04	0.0008	0.0012
305	25	0.98425	0.0002	0.0006	62	2.44095	0	0.0008	17	0.66929	0	0.002	1	0.04	0.0008	0.0012
306	30	1.18110	0.0002	0.0006	72	2.83465	0	0.0008	19	0.74803	0	0.002	2	0.08	0.0008	0.0012
307	35	1.37795	0.0002	0.0006	80	3.14962	0	0.0008	21	0.82677	0	0.002	2	0.08	0.0008	0.0012
308	40	1.57481	0.0002	0.0006	90	3.54332	0	0.0008	23	0.90551	0	0.002	2	0.08	0.0008	0.0012
309	45	1.77166	0.0002	0.0006	100	3.93702	0	0.0008	25	0.98425	0	0.002	2	0.08	0.0010	0.0016
310	50	1.96851	0.0002	0.0006	110	4.33072	0	0.0008	27	1.06299	0	0.002	2	0.08	0.0010	0.0016
311	55	2.16536	0.0002	0.0006	120	4.72443	0	0.0008	29	1.14173	0	0.002	2	0.08	0.0010	0.0016
312	60	2.36221	0.0002	0.0006	130	5.11813	0	0.0008	31	1.22047	0	0.002	2	0.08	0.0010	0.0016
313	65	2.55906	0.0002	0.0006	140	5.51183	0	0.0008	33	1.29921	0	0.002	3	0.12	0.0010	0.0016
314	70	2.75591	0.0002	0.0007	150	5.90554	0	0.0012	35	1.37795	0	0.002	3	0.12	0.0010	0.0016
315	75	2.95277	0.0002	0.0007	160	6.29924	0	0.0012	37	1.45669	0	0.002	3	0.12	0.0010	0.0016
316	80	3.14962	0.0002	0.0007	170	6.69294	0	0.0012	39	1.53544	0	0.002	3	0.12	0.0012	0.0018
317	85	3.34647	0.0002	0.0007	180	7.08664	0	0.0012	41	1.61418	0	0.002	3	0.12	0.0012	0.0018
318	90	3.54332	0.0002	0.0007	190	7.48035	0	0.0012	43	1.69292	0	0.002	3	0.12	0.0012	0.0018
319	95	3.74017	0.0002	0.0007	200	7.87405	0	0.0012	45	1.77166	0	0.002	3	0.12	0.0012	0.0018
320	100	3.93702	0.0002	0.0007	215	8.46460	0	0.0012	47	1.85040	0	0.002	3	0.12	0.0012	0.0018
321	105	4.13387	0.0002	0.0007	225	8.85830	0	0.0012	49	1.92914	0	0.002	3	0.12	0.0012	0.0018
322	110	4.33072	0.0002	0.0007	240	9.44886	0	0.0012	50	1.96851	0	0.002	3	0.12	0.0012	0.0018

*A chamfer of 45 degrees ground true with the bore and outside diameter, is recommended.

(*Continued on page* 604)

Index to Tables and Data appears on Pages 27 to 30.

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SIZES AND TOLERANCES FOR ANNULAR BALL BEARINGS (*S. A. E. Standard*)

HEAVY SERIES

B'g. No.	Bore				Diameter				Width				Corners of the Outer Race and at Bore of* Inner Race		Eccentricity Tolerance in Inches	
	M.M.	Inches	Tolerance in Inches		M.M.	Inches	Tolerance in Inches		M.M.	Inches	Tolerance in Inches (for both races)		M.M.	Inches	Inner Race	Outer Race
			Plus	Minus			Plus	Minus			Plus	Minus				
403	17	0.66929	0.0002	0.0006	62	2.44095	0	0.0008	17	0.66929	0	0.002	1	0.04	0.0008	0.0012
404	20	0.78740	0.0002	0.0006	72	2.83465	0	0.0008	19	0.74803	0	0.002	2	0.08	0.0008	0.0012
405	25	0.98425	0.0002	0.0006	80	3.14962	0	0.0008	21	0.82677	0	0.002	2	0.08	0.0008	0.0012
406	30	1.18110	0.0002	0.0006	90	3.54332	0	0.0008	23	0.90551	0	0.002	2	0.08	0.0008	0.0012
407	35	1.37795	0.0002	0.0006	100	3.93702	0	0.0008	25	0.98425	0	0.002	2	0.08	0.0008	0.0012
408	40	1.57481	0.0002	0.0006	110	4.33072	0	0.0008	27	1.06299	0	0.002	2	0.08	0.0008	0.0012
409	45	1.77166	0.0002	0.0006	120	4.72443	0	0.0008	29	1.14173	0	0.002	2	0.08	0.0010	0.0016
410	50	1.96851	0.0002	0.0006	130	5.11813	0	0.0008	31	1.22047	0	0.002	2	0.08	0.0010	0.0016
411	55	2.16536	0.0002	0.0006	140	5.51183	0	0.0008	33	1.29921	0	0.002	3	0.12	0.0010	0.0016
412	60	2.36221	0.0002	0.0007	150	5.90554	0	0.0012	35	1.37795	0	0.002	3	0.12	0.0010	0.0016
413	65	2.55906	0.0002	0.0007	160	6.29924	0	0.0012	37	1.45669	0	0.002	3	0.12	0.0010	0.0016
414	70	2.75591	0.0002	0.0007	180	7.08664	0	0.0012	42	1.65355	0	0.002	3	0.12	0.0010	0.0016
415	75	2.95277	0.0002	0.0007	190	7.48035	0	0.0012	45	1.77166	0	0.002	3	0.12	0.0010	0.0016
416	80	3.14962	0.0002	0.0007	200	7.87405	0	0.0012	48	1.88977	0	0.002	3	0.12	0.0012	0.0018
417	85	3.34647	0.0002	0.0007	210	8.26775	0	0.0012	52	2.04725	0	0.002	3	0.12	0.0012	0.0018
418	90	3.54332	0.0002	0.0007	225	8.85830	0	0.0012	54	2.12599	0	0.002	3	0.12	0.0012	0.0018
419	95	3.74017	0.0002	0.0007	250	9.84256	0	0.0012	55	2.16536	0	0.002	3	0.12	0.0012	0.0018
420	100	3.93702	0.0002	0.0007	265	10.43311	0	0.0012	60	2.36221	0	0.002	3	0.12	0.0012	0.0018

*A chamfer of 45 degrees ground true with the bore and outside diameter, is recommended

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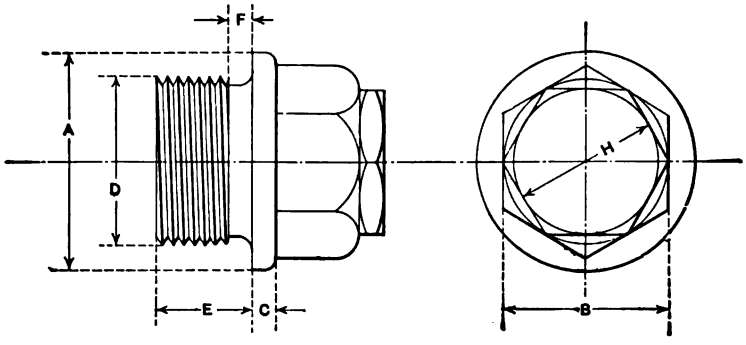
SPARK PLUG SHELL (*S. A. E. Standard*)

The spark plug Shell adopted as a standard has a ⅞-inch diameter, straight thread, 18 pitch, and the design and dimensions shown in the following drawing and specifications:



A—One and one-eighth inch (1⅛").

B—Seven-eighths inch (⅞").

C—One-eighth inch (⅛").

D—Seven-eighths inch (⅞").

Tolerances from precise measurement of thread diameter + 0; — .003.

E—Not less than one-half inch (min. ½").

F—Not more than one-eighth inch (max. ⅛"). (Depth of recess—not over depth of thread).

H—Three-quarters inch (¾").

SPECIFICATIONS

STOCK—1⅛ inch round.
HEAD FORM—Milled Hex.
SHORT DIAMETER—⅞ inch.
FLANGE FORM—Circular.
DIAMETER—1⅛ inch.
THICKNESS—⅛ inch.
FACE—Annular seat ⅛ inch wide. (Suitable for McKim Type Copper-Asbestos Gasket.)
BLANK FOR THREAD—DIAMETER—⅞ inch.
LENGTH—Not less than ½ inch.
RECESS ADJACENT TO FLANGE—WIDTH—Not over ⅛ inch.
DEPTH—Not over depth of thread.
THREAD DIAMETER—⅞ inch straight.
PITCH—18.
FORM—U. S. Standard.
CUT—Perfect into recess.
PACKING-GLAND NUT HEAD—FORM—Hexagonal.
SHORT DIAMETER—¾ inch.

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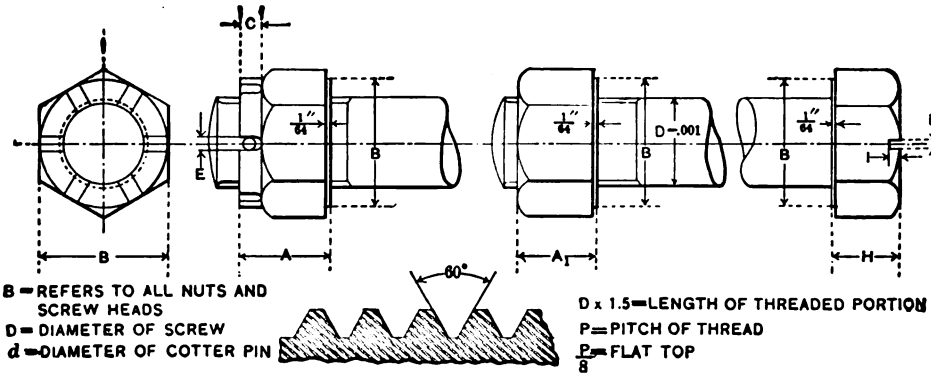
HEXAGON HEAD SCREWS, CASTLE AND PLAIN NUTS (*S. A. E. Standard*)

It is assumed that where screws are to be used in soft material, such as cast-iron, brass, bronze or aluminum, the United States standard pitches will be used.

DIMENSIONS



D	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
P	28	24	24	20	20	18	18	16	16	14	14	12	12	12	12
A	9/32	21/64	13/32	29/64	9/16	39/64	23/32	49/64	13/16	29/32	1	1 5/32	1 1/4	1 13/32	1 1/2
A1	7/32	17/64	21/64	3/8	7/16	31/64	35/64	19/32	21/32	49/64	7/8	63/64	1 3/32	1 13/64	1 5/16
B	7/16	1/2	9/16	5/8	3/4	7/8	15/16	1	1 1/16	1 1/4	1 7/16	1 5/8	1 13/16	2	2 3/16
C	3/32	3/32	1/8	1/8	3/16	3/16	1/4	1/4	1/4	1/4	1/4	5/16	5/16	3/8	3/8
E	5/64	5/64	1/8	1/8	1/8	5/32	5/32	5/32	5/32	5/32	5/32	7/32	7/32	1/4	1/4
H	3/16	15/64	9/32	21/64	3/8	27/64	15/32	33/64	9/16	21/32	3/4	27/32	15/16	1 1/32	1 1/8
I	3/32	7/64	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	7/32	7/32	1/4	1/4
K	1/16	1/16	3/32	3/32	3/32	3/32	3/32	3/32	3/32	3/32	3/32	5/32	5/32	3/16	3/16
d	1/16	1/16	3/32	3/32	3/32	1/8	1/8	1/8	1/8	1/8	1/8	11/64	11/64	13/64	13/64

Dimensions. All dimensions in inches.
Finish. All heads and nuts to be semi-finish.
Material. For all screws and nuts—steel.
Screws are to be left soft. Screw heads are to be left soft. The plain nuts are to be left soft. The Castle nuts are to be case-hardened.

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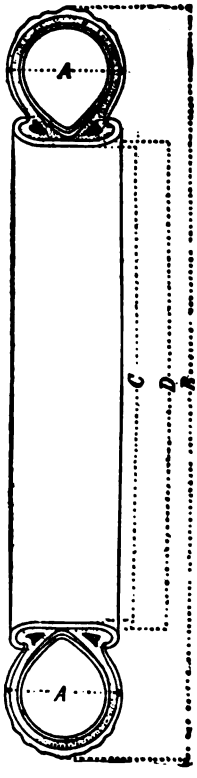
CLINCHER TIRE AND RIM DIMENSIONS



A	B	C	D
Inches	Inches	Inches	Inches
2 ½	26	20 ¾	21
3	26	19 ¾	20
2 ½ and 3	28	21 ¾	22
2 ½ and 3	30	23 ¾	24
3	32	25 ¾	26
3	34	27 ¾	28
3	36	29 ¾	30
3 ½	28	20 11/16	21
3 ½	30	22 11/16	23
3 ½	32	24 11/16	25
3 ½	34	26 11/16	27
3 ½	36	28 11/16	29
4	30	21 11/16	22
4	32	23 11/16	24
4	34	25 11/16	26
4	36	27 11/16	28
4 ½	32	22 11/16	23
4 ½	34	24 11/16	25
4 ½	36	26 11/16	27

PROPORTIONS BETWEEN AXLE LOADS AND TIRE SIZES ADOPTED BY AMERICAN TIRE MAKERS

2 ½-inch tires, all diameters	225 pounds per wheel
3 inch tires, all diameters	350 " " "
3 ½ x 28-inch tires	400 " " "
3 ½ x 30-inch tires	450 " " "
3 ½ x 32-inch tires	555 " " "
3 ½ x 34-inch tires	600 " " "
3 ½ x 36-inch tires	600 " " "
4 x 30-inch tires	550 " " "
4 x 32-inch tires	650 " " "
4 x 34-inch tires	700 " " "
4 x 36-inch tires	750 " " "
4 ½ x 32-inch tires	700 " " "
4 ½ x 34-inch tires	800 " " "
4 ½ x 36-inch tires	900 " " "

For weights in excess of 1,000 pounds per wheel, 5-inch tires and over are recommended. Weights given apply to car without passengers.

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APPROXIMATE WOOD WHEEL DIAMETERS FOR VARIOUS SIZES AND TYPES OF RIMS

Size Tire	Clincher Universal and Stanweld Detachable	Firestone Demountable	Fisk Bolted On	Fisk Demountable	Stanweld Demountable	Stanweld Demountable Metric Sizes
30 × 3½	22 11/16	21 11/16	21 13/16	19 3/16	22	.....
32 × 3½	24 11/16	23 11/16	23 13/16	21 3/16	24	810 × 90 — 23 3/16
34 × 3½	26 11/16	25 11/16	25 13/16	23 3/16	26	870 × 90 — 25 5/8
36 × 3½	28 11/16	27 11/16	27 13/16	.....	28	910 × 90 — 27 3/16
30 × 4	21 11/16	20 11/16	20 5/8	.....	21	.....
32 × 4	23 11/16	22 11/16	22 5/8	20	23	.....
34 × 4	25 11/16	24 11/16	24 5/8	22	25	875 × 105 — 25 5/8
36 × 4	27 11/16	26 11/16	26 5/8	24	27	915 × 105 — 27 3/16
32 × 4½	22 21/32	21 21/32	21½	.....	.....	820 × 120 — 21 17/64
34 × 4½	24 21/32	23 21/32	23½	20 13/16	23 59/64	880 × 120 — 23 47/64
36 × 4½	26 21/32	25 21/32	25½	22 13/16	25 59/64	920 × 120 — 25 3/16
34 × 5	23 21/32	22 21/32	.....	19 7/16	22 59/64	.....
36 × 5	25 21/32	24 21/32	.....	21 13/16	24 59/64	.....
36 × 5½	24 21/32	23 21/32	.....	.....	.....	935 × 135 — 24 3/64
37 × 5½	25 21/32	24 21/32	.....	.....	24 3/64	.....

NON-FERROUS METAL TUBING TOLERANCES

Tubing can be furnished in copper, and the commercial alloys of copper and zinc, such as high brass, bronze, phosphor bronze, and tobin bronze.

Composition.—As specified to meet the requirements of use.

Temper.—As specified in the order; may be hard, half hard or annealed. If annealed, the tubing may be soft, or light annealed.

Size variation.—On inside and outside diameter and the thickness of the walls, as follows:

Outside and Inside Dimensions

Up to ½ in. inclusive	0.002 in. over or under
Over ½ in. to and including ¾ in	0.0025 in. over or under
Over ¾ in. to and including 1 in	0.003 in. over or under
Over 1 in. to and including 1¼ in	0.0035 in. over or under
Over 1¼ in. to and including 1½ in	0.004 in. over or under
Over 1½ in. to and including 1¾ in	0.0045 in. over or under
Over 1¾ in. to and including 2 in	0.005 in. over or under
Over 2 in	¼ of 1 per cent. over or under

No combination of variations on the same tube shall make the thickness of the wall vary from the nominal by more than the following amounts:

Thickness of Wall

Up to and including 1/64 in	0.001 in. over or under
Over 1/64 in. to and including 1/32 in	0.002 in. over or under
Over 1/32 in. to and including 1/16 in	0.003 in. over or under
Over 1/16 in. to and including ⅛ in	0.005 in. over or under
Over ⅛ in. to and including ¼ in	0.008 in. over or under
Over ¼ in. to and including 5/16 in	0.0125 in. over or under
Over 5/16 in. to and including ⅜ in	0.015 in. over or under

Special limits.—On all stock where the above commercial variations are not permissible limits shall be specified in the order.

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AUTOMOBILE WHEEL DATA

The following information is approximately correct, but the weights, etc., may vary according to the height of wheels, etc.:

WEIGHT OF WHEELS PER SET OF FOUR

Weight of wheels and hubs without rims or channels, size of spoke 7/8 to 1" or 1 1/8", about	50	pounds
" same size with steel rims for 2 1/2" or 3" tire	110	"
" 1" or 1 1/8" spokes	65	"
" including rims for 3" or 3 1/2" tires	145	"
" 1 1/4" or 1 3/8" spokes	100	"
" including rims for 3 1/2" or 4" tires	210	"
" 1 3/8" or 1 1/2" spokes	112	"
" including rims for 4" or 4 1/2" tire	250	"

Axles are not included in above.

METRIC TIRES AND THEIR AMERICAN EQUIVALENTS

Metric Sizes	Approximate Size in Inches
650 x 65	26 x 2 1/2
700 x 65	28 x 2 1/2
750 x 65	30 x 2 1/2
800 x 65	32 x 2 1/2
830 x 65	33 x 2 1/2
860 x 65	34 x 2 1/2
700 x 85	28 x 3 1/4
750 x 85	30 x 3 1/4
800 x 85	32 x 3 1/4
860 x 85	34 x 3 1/4
760 x 90	30 x 3 1/2
810 x 90	32 x 3 1/2
840 x 90	32 x 3 1/2
870 x 90	34 x 3 1/2
910 x 90	36 x 3 1/2
960 x 90	38 x 3 1/2
1010 x 90	40 x 3 1/2
815 x 105	32 x 4
875 x 105	34 x 4
915 x 105	36 x 4
820 x 120	32 x 4 1/2–5
850 x 120	33 x 4 1/2–5
880 x 120	34 x 4 1/2–5
920 x 120	36 x 4 1/2–5
1020 x 120	40 x 4 1/2–5
1080 x 120	42 x 4 1/2–5

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CHEMICAL COMPOSITION AND PHYSICAL PROPERTIES OF VARIOUS SUBSTANCES THAT HAVE A HEAT VALUE

Fuel	Chemical Proportions	Weight of Gas at 30°, per Cubic Foot	Volume of 1 Pound of Gas at Atmospheric Pressure, Cubic Feet		Volume Required to Burn 1 Cubic Foot of Gas, Cubic Feet		Weight Required to Burn 1 Pound of Gas, Pounds		Specific Heat of Gas at Constant Pressure	Heat of Combustion	
		Pound	32°	62°	O	Air	O	Air		B.T.U. per Pound of Fuel	B.T.U. per Cubic Foot of Gas at 62°
Oxygen, O	23 lb. O + 77 lb. N = 100 lb. air	.08927	11.20	11.88	...	.....	....	.....	.21751	.....	.....
Nitrogen, N	21 vol. O + 79 vol. N = 100 vol. air	.07847	12.77	13.55	...	.....	....	.....	.24380	.....	.....
Hyrdogen, H	$2H + O = H_2O$	.00562	178.80	189.80	.5	2.38	8.00	34.80	3.40900	62,000	327
Carbon, C	$C + O = CO$	.....	.....	.....	...	.....	....	.....	.....	4,400	.....
Carbon, C	$C + 2O = CO_2$	.....	.....	.....	...	.....	....	.....	.....	14,600	.....
Carbon monoxide, CO	$CO + O = CO_2$	.07704	12.77	13.55	.5	2.38	.57	2.48	.24790	.....	324
Carbon dioxide, CO_2	1 lb. C + 2.66 lb. O = 3.66 lb. CO_2	.12323	8.12	8.60	...	.....	....	.....	.21700	4,385	.....
Methane (marsh gas), CH_4	$CH_4 + 4O = 2H_2O + CO_2$	.04538	22.37	23.73	2.0	9.52	4.00	17.40	.59290	23,976	1,010
Ethylene (olefiant gas), C_2H_4	$C_2H_4 + 6O = 2H_2O + 2CO_2$	.07830	12.77	13.55	3.0	14.28	3.43	14.90	.40400	21,476	1,585
Ethane, C_2H_6	$C_2H_6 + 7O = 3H_2O + 2CO_2$	.08369	11.94	12.67	3.5	16.66	....	.....	.....	22,356	1,765
Benzol vapors, C_6H_6	$C_6H_6 + 15O = 3H_2O + 6CO_2$	.22363	4.47	4.74	7.5	35.7	....	.....	.37540	18,183	3,836
Acetylene, C_2H_2	$C_2H_2 + 5O = H_2O + 2CO_2$	.07251	13.79	14.63	2.5	11.9	....	.....	.....	21,421	1,464

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MOLECULAR WEIGHT OF PETROLEUM DISTILLATES

The atomic weight of the elements entering into the fractions may be set down thus:

Hydrogen	1
Carbon	12
Oxygen	16

The molecular weight may be found as follows:

(*a*) butane, $C_4H_{10} = 4 \times 12 + 10 \times 1 = 58$;
(*b*) pentane, $C_5H_{12} = 5 \times 12 + 12 \times 1 = 72$;
(*c*) hexane, $C_6H_{14} = 6 \times 12 + 14 \times 1 = 86$;
(*d*) heptane, $C_7H_{16} = 7 \times 12 + 16 \times 1 = 100$;
(*e*) octane, $C_8H_{18} = 8 \times 12 + 18 \times 1 = 114$;
(*f*) nonane, $C_9H_{20} = 9 \times 12 + 20 \times 1 = 128$;
(*g*) decane, $C_{10}H_{22} = 10 \times 12 + 22 \times 1 = 142$.

In like manner the molecular weight of any of the compounds may be found, the rule for which may be stated as follows:

Multiply the atomic weight of each element by the number of atoms for each element and the sum of the respective products will be the molecular weight of the resultant compound.

In general practice it has been the custom to consider that gasoline was largely hexane, the molecular weight of which was taken in the further determinations. It is highly improbable that this method will serve, for the reason that hexane is not now used to the same extent as formerly and the chances are that heptane and octane will have to be taken into account.

TABLE OF APPROXIMATE CAPACITIES IN LIQUID GALLONS FOR CIRCULAR TANKS

1	2	3	4	5	6	7	8	9	10	Gallons	Gal'ns per Inch
5x12	6x18	6x24	6x36	6x42						6″ diam'r	.122
	7x12	7x18	7x24	7x30	7x36	7x42	7x48			7″ "	.165
		8x15	8x18	8x24	8x30	8x36	8x42	8x45	8x48	8″ "	.217
		9x12	9x15	9x18	9x24	9x30	9x34	9x36	9x40	9″ "	.275
					10x20	10x24	10x26	10x28	10x32	10″ "	.340
						12x16	12x18	12x20	12x24	12″ "	.486

10	15	20	25	30	35	40	45	50	Gallons	Gal'ns per Inch
8x48									8″ diam'r	.217
9x40									9″ "	.275
10x32	10x48								10″ "	.340
12x24	12x34	12x42	12x50	12x60					12″ "	.486
14x18	14x24	14x30	14x38	14x44	14x52	14x60			14″ "	.666
	16x18	16x24	16x30	16x36	16x42	16x48	16x54	16x60	16″ "	.870

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CAPACITY OF ATMOSPHERIC AIR FOR WATER VAPOR AT DIFFERENT TEMPERATURES

Temperature in Degrees Fahrenheit	Pounds per Cubic Feet Dry Air	Pounds of Vapor in One Pound of Air	Weight in Pounds, Cubic Feet Saturated Air	Vapor in Air	A | V
32	0.0807	0.00379	0.0802	0.000304	263.7
42	0.0791	0.00561	0.0784	0.000440	178.18
52	0.0776	0.00819	0.0766	0.000627	122.
62	0.0761	0.01179	0.0747	0.000881	85.
72	0.0747	0.01680	0.0727	0.001221	59.5
82	0.0733	0.02361	0.0706	0.001667	42.3
92	0.0720	0.03289	0.0684	0 002250	30.3
102	0.0707	0.04547	0.0659	0.002997	22.

VARIATION OF VOLUME AND TEMPERATURE WITH COMPRESSION

Gauge Pressure	Volume	Temperature
0	1.000	60
2	.910	80.4
5	.810	106
10	.690	145
20	.543	207
30	.454	252
40	.393	302
50	.350	339
75	.276	420
100	.232	485
115	.213	518
130	.197	550
145	.184	580
160	.172	607
175	.163	632
200	.149	672

The foregoing table is based on the assumption that no heat is added or subtracted.

VISCOSITY OF GASOLINE

In considering the functioning of the gasoline carbureter, changes in viscosity of the fuel due to differences in temperature should be considered. It is a mistake to assume that because gasoline does not noticeably thicken up at the lower atmospheric temperatures (usual in the Northern States in winter) it will flow through the nozzle of a carbureter at the same rate under all heat conditions. Taking gasoline of a specific gravity of 0.71, it has been shown by experiment that the amount which will pass through a nozzle of a carbureter under a given pressure will increase as the temperature is increased in the following manner:

Temperature in ° F.	50	59	68	77	86	95
Relative flow	1	1.073	1.145	1.212	1.27	1.335

Since nozzles in carbureters are not readily adjustable, and with any degree of certainty, it follows that such a great difference in the weight of fuel ejected, considering the differences in temperature named, is bound to lead to a certain amount of carbureter inefficiency of the kind which does not readily yield to treatment.

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TABLE FOR THE DIVISION OF THE CIRCUMFERENCE

Number of Divisions in the Circumference	Angle of Corresponding Division of Circle; Degrees	Length of Chord in Decimal Fraction of Radius	Number of Divisions in the Circumference	Angle of Corresponding Division of Circle; Degrees	Length of Chord in Decimal Fraction of Radius
3	120	1.73206	52	6.55	0.120356
4	90	1.41422	53	6.47	0.118032
5	72	1.17558	54	6.40	0.11629
6	60	1	55	6.32	0.113966
7	51.25	0.86732	56	6.25	0.111644
8	45	0.76536	57	6.18	0.1099
9	40	0.68404	58	6.12	0.108158
10	36	0.61804	59	6.06	0.106414
11	32.43	0.563	60	6	0.104672
12	30	0.51764	61	5.54	0.102928
13	27	0.4782	62	5.48	0.101186
14	25	0.4448	63	5.42	0.099442
15	24	0.41582	64	5.37	0.0977
16	22.30	0.39018	65	5.32	0.096538
17	21.10	0.36734	66	5.27	0.094794
18	20	0.3473	67	5.22	0.093632
19	18.56	0.32894	68	5.17	0.091888
20	18	0.31286	69	5.13	0.090765
21	17.08	0.29792	70	5.08	0.089564
22	16.21	0.2841	71	5.04	0.088402
23	15.39	0.272	72	5	0.087238
24	15	0.26106	73	4.55	0.085496
25	14.24	0.25066	74	4.51	0.084332
26	13.50	0.24086	75	4.48	0.083752
27	13.20	0.23218	76	4.44	0.083588
28	12.51	0.22352	77	4.40	0.081426
29	12.24	0.216	78	4.36	0.080264
30	12	0.20906	79	4.33	0.0791
31	11.36	0.20212	80	4.30	0.078518
32	11.15	0.19574	81	4.26	0.077356
33	10.54	0.18996	82	4.23	0.076194
34	10.35	0.18416	83	4.20	0.075612
35	10.17	0.17894	84	4.17	0.07445
36	10	0.17432	85	4.14	0.073868
37	9.43	0.1691	86	4.11	0.072706
38	9.28	0.16504	87	4.08	0.072124
39	9.13	0.1604	88	4.05	0.070962
40	9	0.15692	89	4.02	0.07038
41	8.46	0.15286	90	4.	0.069798
42	8.34	0.14938	91	3.57	0.0686362
43	8.22	0.1459	92	3.54	0.0680546
44	8.10	0.14242	93	3.52	0.0674732
45	8	0.13952	94	3.49	0.0663104
46	7.49	0.13603	95	3.47	0.0657288
47	7.39	0.133128	96	3.45	0.0651474
48	7.30	0.130806	97	3.42	0.064566
49	7.20	0.127904	98	3.40	0.0639844
50	7.12	0.125582	99	3.38	0.63403
51	7.03	0.122678	100	3.36	0.0628216

This table should be useful for gear and chain wheel calculation and design

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CIRCUMFERENCES AND AREAS OF CIRCLES

ADVANCING BY EIGHTHS

Diam.	Circum.	Area	Diam.	Circum.	Area	Diam.	Circum.	Area
1/64	.04909	.00019	2 3/8	7.4613	4.4301	6 1/8	19.242	29.465
1/32	.09818	.00077	7/16	7.6576	4.6664	1/4	19.635	30.680
3/64	.14726	.00173	1/2	7.8540	4.9087	3/8	20.028	31.919
1/16	.19635	.00307	9/16	8.0503	5.1572	1/2	20.420	33.183
3/32	.29452	.00690	5/8	8.2467	5.4119	5/8	20.813	34.472
1/8	.39270	.01227	11/16	8.4430	5.6727	3/4	21.206	35.785
5/32	.49087	.01917	3/4	8.6394	5.9396	7/8	21.598	37.122
3/16	.58905	.02761	13/16	8.8357	6.2126	7	21.991	38.485
7/32	.68722	.03758	7/8	9.0321	6.4918	1/8	22.384	39.871
			15/16	9.2284	6.7771	1/4	22.776	41.282
1/4	.78540	.04909				3/8	23.169	42.718
9/32	.88357	.06213	3	9.4284	7.0686	1/2	23.562	44.179
5/16	.98175	.07670	1/16	9.6211	7.3662	5/8	23.955	45.664
11/32	1.0799	.09281	1/8	9.8175	7.6699	3/4	24.347	47.173
3/8	1.1781	.11045	3/16	10.014	7.9798	7/8	24.740	48.707
13/32	1.2763	.12962	1/4	10.210	8.2958	8	25.133	50.265
7/16	1.3744	.15033	5/16	10.407	8.6179	1/8	25.525	51.849
15/32	1.4726	.17257	3/8	10.603	8.9462	1/4	25.918	53.456
			7/16	10.799	9.2806	3/8	26.311	55.088
1/2	1.5708	.19635	1/2	10.996	9.6211	1/2	26.704	56.745
17/32	1.6690	.22166	9/16	11.192	9.9678	5/8	27.096	58.426
9/16	1.7671	.24850	5/8	11.388	10.321	3/4	27.489	60.132
19/32	1.8653	.27688	11/16	11.585	10.680	7/8	27.882	61.862
5/8	1.9635	.30680	3/4	11.781	11.045	9	28.274	63.617
21/32	2.0617	.33824	13/16	11.977	11.416	1/8	28.667	65.397
11/16	2.1598	.37122	7/8	12.174	11.793	1/4	29.060	67.201
23/32	2.2580	.40574	15/16	12.370	12.177	3/8	29.452	69.029
			4	12.566	12.566	1/2	29.845	70.882
3/4	2.3562	.44179	1/16	12.763	12.962	5/8	30.238	72.760
25/32	2.4544	.47937	1/8	12.959	13.364	3/4	30.631	74.662
13/16	2.5525	.51849	3/16	13.155	13.772	7/8	31.023	76.589
27/32	2.6507	.55914	1/4	13.352	14.186	10	31.416	78.540
7/8	2.7489	.60132	5/16	13.548	14.607	1/8	31.809	80.516
29/32	2.8471	.64504	3/8	13.744	15.033	1/4	32.201	82.516
15/16	2.9452	.69029	7/16	13.941	15.466	3/8	32.594	84.541
31/32	3.0434	.73708	1/2	14.137	15.904	1/2	32.987	86.590
			9/16	14.334	16.349	5/8	33.379	88.664
1	3.1416	.7854	5/8	14.530	16.800	3/4	33.772	90.763
1/16	3.3379	.8866	11/16	14.726	17.257	7/8	34.165	92.886
1/8	3.5343	.9940	3/4	14.923	17.728	11	34.558	95.033
3/16	3.7306	1.1075	13/16	15.119	18.190	1/8	34.950	97.205
1/4	3.9270	1.2272	7/8	15.315	18.665	1/4	35.343	99.402
5/16	4.1233	1.3530	15/16	15.512	19.147	3/8	35.736	101.62
3/8	4.3197	1.4849	5	15.708	19.635	1/2	36.128	103.87
7/16	4.5160	1.6230	1/16	15.904	20.129	5/8	36.521	106.14
1/2	4.7124	1.7671	1/8	16.101	20.629	3/4	36.914	108.43
9/16	4.9087	1.9175	3/16	16.297	21.135	7/8	37.306	110.75
5/8	5.1051	2.0739	1/4	16.493	21.648	12	37.699	113.10
11/16	5.3014	2.2365	5/16	16.690	22.166	1/8	38.092	115.47
3/4	5.4978	2.4053	3/8	16.886	22.691	1/4	38.485	117.86
13/16	5.6941	2.5802	7/16	17.082	23.221	3/8	38.877	120.28
7/8	5.8905	2.7612	1/2	17.279	23.758	1/2	39.270	122.72
15/16	6.0868	2.9483	9/16	17.475	24.301	5/8	39.663	125.19
			5/8	17.671	24.850	3/4	40.055	127.68
2	6.2832	3.1416	11/16	17.868	25.406	7/8	40.448	130.19
1/16	6.4795	3.3410	3/4	18.064	25.967	13	40.841	132.73
1/8	6.6759	3.5466	13/16	18.261	26.535	1/8	41.233	135.30
3/16	6.8722	3.7583	7/8	18.457	27.109	1/4	41.626	137.89
1/4	7.0686	3.9761	15/16	18.653	27.688	3/8	42.019	140.50
5/16	7.2649	4.2000	6	18.850	28.274	1/2	42.412	143.14

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CIRCUMFERENCES AND AREAS OF CIRCLES

Diam.	Circum.	Area
13. ⅝	42.804	145.80
¾	43.197	148.49
⅞	43.590	151.20
14.	43.982	153.94
⅛	44.375	156.70
¼	44.768	159.48
⅜	45.160	162.30
½	45.553	165.13
⅝	45.946	167.99
¾	46.338	170.87
⅞	46.731	173.78
15.	47.124	176.71
⅛	47.517	179.67
¼	47.909	182.65
⅜	48.302	185.66
½	48.695	188.69
⅝	49.087	191.75
¾	49.480	194.83
⅞	49.873	197.93
16.	50.265	201.06
⅛	50.658	204.22
¼	51.051	207.39
⅜	51.444	210.60
½	51.836	213.82
⅝	52.229	217.08
¾	52.622	220.35
⅞	53.014	223.65
17.	53.407	226.98
⅛	53.800	230.33
¼	54.192	233.71
⅜	54.585	237.10
½	54.978	240.53
⅝	55.371	243.98
¾	55.763	247.45
⅞	56.156	250.95
18.	56.549	254.47
⅛	56.941	258.02
¼	57.334	261.59
⅜	57.727	265.18
½	58.119	268.80
⅝	58.512	272.45
¾	58.905	276.12
⅞	59.298	279.81
19.	59.690	283.53
⅛	60.083	287.27
¼	60.476	291.04
⅜	60.868	294.83
½	61.261	298.65
⅝	61.654	302.49
¾	62.046	306.35
⅞	62.439	310.24
20.	62.832	314.16
⅛	63.225	318.10
¼	63.617	322.06
⅜	64.010	326.05
½	64.403	330.06
⅝	64.795	334.10
¾	65.188	338.16
⅞	65.581	342.25
21	65.973	346.36
⅛	66.366	350.50
¼	66.759	354.66
⅜	67.152	358.84
½	67.544	363.05
⅝	67.937	367.28
¾	68.330	371.54
21. ⅞	68.722	375.83
22.	69.115	380.13
⅛	69.508	384.46
¼	69.900	388.82
⅜	70.293	393.20
½	70.686	397.61
⅝	71.079	402.04
¾	71.471	406.49
⅞	71.864	410.97
23.	72.257	415.48
⅛	72.649	420.00
¼	73.042	424.56
⅜	73.435	429.13
½	73.827	433.74
⅝	74.220	438.36
¾	74.613	443.01
⅞	75.006	447.69
24.	75.398	452.39
⅛	75.791	457.11
¼	76.184	461.86
⅜	76.576	466.64
½	76.969	471.44
⅝	77.362	476.26
¾	77.754	481.11
⅞	78.147	485.98
25.	78.540	490.87
⅛	78.933	495.79
¼	79.325	500.74
⅜	79.718	505.71
½	80.111	510.71
⅝	80.503	515.72
¾	80.896	520.77
⅞	81.289	525.84
26.	81.681	530.93
⅛	82.074	536.05
¼	82.467	541.19
⅜	82.860	546.35
½	83.252	551.55
⅝	83.645	556.76
¾	84.038	562.00
⅞	84.430	567.27
27.	84.823	572.56
⅛	85.216	577.87
¼	85.608	583.21
⅜	86.001	588.57
½	86.394	593.96
⅝	86.786	599.37
¾	87.179	604.81
⅞	87.572	610.27
28.	87.965	615.75
⅛	88.357	621.26
¼	88.750	626.80
⅜	89.143	632.36
½	89.535	637.94
⅝	89.928	643.55
¾	90.321	649.18
⅞	90.713	654.84
29.	91.106	660.52
⅛	91.499	666.23
¼	91.892	671.96
⅜	92.284	677.71
½	92.677	683.49
⅝	93.070	689.30
¾	93.462	695.13
⅞	93.855	700.98
30.	94.248	706.86
30. ⅛	94.640	712.76
¼	95.033	718.69
⅜	95.426	724.64
½	95.819	730.62
⅝	96.211	736.62
¾	96.604	742.64
⅞	96.997	748.69
31.	97.389	754.77
⅛	97.782	760.87
¼	98.175	766.99
⅜	98.567	773.14
½	98.960	779.31
⅝	99.353	785.51
¾	99.746	791.73
⅞	100.138	797.98
32.	100.531	804.25
⅛	100.924	810.54
¼	101.316	816.86
⅜	101.709	823.21
½	102.102	829.58
⅝	102.494	835.97
¾	102.887	842.39
⅞	103.280	848.83
33.	103.673	855.30
⅛	104.065	861.79
¼	104.458	868.31
⅜	104.851	874.85
½	105.243	881.41
⅝	105.636	888.00
¾	106.029	894.62
⅞	106.421	901.26
34.	106.814	907.92
⅛	107.207	914.61
¼	107.600	921.32
⅜	107.992	928.06
½	108.385	934.82
⅝	108.778	941.61
¾	109.170	948.42
⅞	109.563	955.25
35.	109.956	962.11
⅛	110.348	969.00
¼	110.741	975.91
⅜	111.134	982.84
½	111.527	989.80
⅝	111.919	996.78
¾	112.312	1003.8
⅞	112.705	1010.8
36.	113.097	1017.9
⅛	113.490	1025.0
¼	113.883	1032.1
⅜	114.275	1039.2
½	114.668	1046.3
⅝	115.061	1053.5
¾	115.454	1060.7
⅞	115.846	1068.0
37.	116.239	1075.2
⅛	116.632	1082.5
¼	117.024	1089.8
⅜	117.417	1097.1
½	117.810	1104.5
⅝	118.202	1111.8
¾	118.596	1119.2
⅞	118.988	1126.7
38.	119.381	1134.1
⅛	119.773	1141.6
¼	120.166	1149.1

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CIRCUMFERENCES AND AREAS OF CIRCLES

Diam.	Circum.	Area	Diam.	Circum.	Area	Diam.	Circum.	Area
38. 3/8	120.559	1156.6	**46.** 5/8	146.477	1707.4	**54.** 7/8	172.395	2365.0
1/2	120.951	1164.2	3/4	146.869	1716.5	**55.**	172.788	2375.8
5/8	121.344	1171.7	7/8	147.262	1725.7	1/8	173.180	2386.6
3/4	121.737	1179.3	**47.**	147.655	1734.9	1/4	173.573	2397.5
7/8	122.129	1186.9	1/8	148.048	1744.2	3/8	173.966	2408.3
39.	122.522	1194.6	1/4	148.440	1753.5	1/2	174.358	2419.2
1/8	122.915	1202.3	3/8	148.833	1762.7	5/8	174.751	2430.1
1/4	123.308	1210.0	1/2	149.226	1772.1	3/4	175.144	2441.1
3/8	123.700	1217.7	5/8	149.618	1781.4	7/8	175.536	2452.0
1/2	124.093	1225.4	3/4	150.011	1790.8	**56.**	175.929	2463.0
5/8	124.486	1233.2	7/8	150.404	1800.1	1/8	176.322	2474.0
3/4	124.878	1241.0	**48.**	150.796	1809.6	1/4	176.715	2485.0
7/8	125.271	1248.8	1/8	151.189	1819.0	3/8	177.107	2496.1
40.	125.664	1256.6	1/4	151.582	1828.5	1/2	177.500	2507.2
1/8	126.056	1264.5	3/8	151.975	1837.9	5/8	177.893	2518.3
1/4	126.449	1272.4	1/2	152.367	1847.5	3/4	178.285	2529.4
3/8	126.842	1280.3	5/8	152.760	1857.0	7/8	178.678	2540.6
1/2	127.235	1288.2	3/4	153.153	1866.5	**57.**	179.071	2551.8
5/8	127.627	1296.2	7/8	153.545	1876.1	1/8	179.463	2563.0
3/4	128.020	1304.2	**49.**	153.938	1885.7	1/4	179.856	2574.2
7/8	128.413	1312.2	1/8	154.331	1895.4	3/8	180.249	2585.4
41.	128.805	1320.3	1/4	154.723	1905.0	1/2	180.642	2596.7
1/8	129.198	1328.3	3/8	155.116	1914.7	5/8	181.034	2608.0
1/4	129.591	1336.4	1/2	155.509	1924.4	3/4	181.427	2619.4
3/8	129.983	1344.5	5/8	155.902	1934.2	7/8	181.820	2630.7
1/2	130.376	1352.7	3/4	156.294	1943.9	**58.**	182.212	2642.1
5/8	130.769	1360.8	7/8	156.687	1953.7	1/8	182.605	2653.5
3/4	131.161	1369.0	**50.**	157.080	1963.5	1/4	182.998	2664.9
7/8	131.554	1377.2	1/8	157.472	1973.3	3/8	183.390	2676.4
42.	131.947	1385.4	1/4	157.865	1983.2	1/2	183.783	2687.8
1/8	132.340	1393.7	3/8	158.258	1993.1	5/8	184.176	2699.3
1/4	132.732	1402.0	1/2	158.650	2003.0	3/4	184.569	2710.9
3/8	133.125	1410.3	5/8	159.043	2012.9	7/8	184.961	2722.4
1/2	133.518	1418.6	3/4	159.426	2022.8	**59.**	185.354	2734.0
5/8	133.910	1427.0	7/8	159.829	2032.8	1/8	185.747	2745.6
3/4	134.303	1435.4	**51.**	160.221	2042.8	1/4	186.139	2757.2
7/8	134.696	1443.8	1/8	160.614	2052.8	3/8	186.532	2768.8
43.	135.088	1452.2	1/4	161.007	2062.9	1/2	186.925	2780.5
1/8	135.481	1460.7	3/8	161.399	2073.0	5/8	187.317	2792.2
1/4	135.874	1469.1	1/2	161.792	2083.1	3/4	187.710	2803.9
3/8	136.267	1477.6	5/8	162.185	2093.2	7/8	188.103	2815.7
1/2	136.659	1486.2	3/4	162.577	2103.3	**60.**	188.496	2827.4
5/8	137.052	1494.7	7/8	162.970	2113.5	1/8	188.888	2839.2
3/4	137.445	1503.3	**52.**	163.363	2123.7	1/4	189.281	2851.0
7/8	137.837	1511.9	1/8	163.756	2133.9	3/8	189.674	2862.9
44.	138.230	1520.5	1/4	164.148	2144.2	1/2	190.066	2874.8
1/8	138.623	1529.2	3/8	164.541	2154.5	5/8	190.459	2886.6
1/4	139.015	1537.9	1/2	164.934	2164.8	3/4	190.852	2898.6
3/8	139.408	1546.6	5/8	165.326	2175.1	7/8	191.244	2910.5
1/2	139.801	1555.3	3/4	165.719	2185.4	**61.**	191.637	2922.5
5/8	140.194	1564.0	7/8	166.112	2195.8	1/8	192.030	2934.5
3/4	140.586	1572.8	**53.**	166.504	2206.2	1/4	192.423	2946.5
7/8	140.979	1581.6	1/8	166.897	2216.6	3/8	192.815	2958.5
45.	141.372	1590.4	1/4	167.290	2227.0	1/2	193.208	2970.6
1/8	141.764	1599.3	3/8	167.683	2237.5	5/8	193.601	2982.7
1/4	142.157	1608.2	1/2	168.075	2248.0	3/4	193.993	2994.8
3/8	142.550	1617.0	5/8	168.468	2258.5	7/8	194.386	3006.9
1/2	142.942	1626.0	3/4	168.861	2269.1	**62.**	194.779	3019.1
5/8	143.335	1634.9	7/8	169.253	2279.6	1/8	195.171	3031.3
3/4	143.728	1643.9	**54.**	169.646	2290.2	1/4	195.564	3043.5
7/8	144.121	1652.9	1/8	170.039	2300.8	3/8	195.957	3055.7
46.	144.513	1661.9	1/4	170.431	2311.5	1/2	196.350	3068.0
1/8	144.906	1670.9	3/8	170.824	2322.1	5/8	196.742	3080.3
1/4	145.299	1680.0	1/2	171.217	2332.8	3/4	197.135	3092.6
3/8	145.691	1689.1	5/8	171.609	2343.5	7/8	197.528	3104.9
1/2	146.084	1698.2	3/4	172.002	2354.3	**63.**	197.920	3117.2

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AREAS OF SMALL CIRCLES

Diameter	Areas									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.0	.000078	.00031	.0007	.00125	.00196	.00283	.00385	.00503	.00636
.1	.0078	.0095	.0113	.0133	.0154	.0177	.0201	.0227	.0255	.0283
.2	.0314	.03464	.038	.0415	.0452	.0491	.0531	.0572	.0616	.066
.3	.0706	.0755	.0804	.0855	.0908	.0962	.1018	.1075	.1134	.1195
.4	.1256	.132	.1385	.1452	.1520	.1590	.1662	1735	.181	.1886
.5	.1963	.2043	.2124	.2206	.2290	.2376	.2463	.2552	.2642	.2734
.6	.2827	.2922	.3014	.3117	.3217	.3318	.3421	.3526	.3632	.3739
.7	.3848	.3959	.4071	.4185	.4301	.4418	.4536	.4657	.4778	.4902
.8	.5026	.5153	.5281	.5411	.5542	.5674	.5809	.5945	.6082	.6221
.9	.6362	.6504	.6648	.6793	.694	.7088	.7238	.739	.7543	.7698

DECIMAL EQUIVALENTS OF FRACTIONS OF AN INCH

1/64 = .0156	17/64 = .2656	33/64 = .5156	49/64 = .7656
1/32 = .0312	9/32 = .2812	17/32 = .5312	25/32 = .7812
3/64 = .0468	19/64 = .2968	35/64 = .5468	51/64 = .7968
1/16 = .0625	5/16 = .3125	9/16 = .5625	13/16 = .8125
5/64 = .0781	21/64 = .3281	37/64 = .5781	53/64 = .8281
3/32 = .0937	11/32 = .3437	19/32 = .5937	27/32 = .8437
7/64 = .1093	23/64 = .3593	39/64 = .6093	55/64 = .8593
1/8 = .1250	3/8 = .3750	5/8 = .6250	7/8 = .8750
9/64 = .1406	25/64 = .3906	41/64 = .6406	57/64 = .8906
5/32 = .1562	13/32 = .4062	21/32 = .6562	29/32 = .9062
11/64 = .1718	27/64 = .4218	43/64 = .6718	59/64 = .9218
3/16 = .1875	7/16 = .4375	11/16 = .6875	15/16 = .9375
13/64 = .2031	29/64 = .4531	45/64 = .7031	61/64 = .9531
7/32 = .2187	15/32 = .4687	23/32 = .7187	31/32 = .9687
15/64 = .2343	31/64 = .4843	47/64 = .7343	63/64 = .9843
1/4 = .2500	1/2 = .5000	3/4 = .7500	1 = 1.0000

Index to Tables and Data appears on Pages 27 to 30.

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DECIMAL FRACTIONS OF A LINEAL INCH IN MILLIMETRES

Inch	Milli-metres	Inch	Milli-metres	Inch	Milli-metres	Inches	Milli-metres
.01	.254	.29	7.366	.57	14.478	.85	21.590
.02	.508	.30	7.620	.58	14.732	.86	21.844
.03	.762	.31	7.874	.59	14.986	.87	22.098
.04	1.016	.32	8.128	.60	15.240	.88	22.352
.05	1.270	.33	8.382	.61	15.494	.89	22.606
.06	1.254	.34	8.636	.62	15.748	.90	22.860
.07	1.778	.35	8.890	.63	16.002	.91	23.114
.08	2.032	.36	9.114	.64	16.256	.92	23.368
.09	2.286	.37	9.398	.65	16.510	.93	23.622
.10	2.540	.38	9.652	.66	16.764	.94	23.876
.11	2.794	.39	9.906	.67	17.018	.95	24.130
.12	3.048	.40	10.160	.68	17.272	.96	24.384
.13	3.302	.41	10.414	.69	17.526	.97	24.638
.14	3.556	.42	10.668	.70	17.780	.98	24.892
.15	3.810	.43	10.922	.71	18.034	.99	25.146
.16	4.064	.44	11.176	.72	18.288	1.00	25.400
.17	4.318	.45	11.430	.73	18.542	2.00	50.799
.18	4.572	.46	11.684	.74	18.796	3.00	76.199
.19	4.826	.47	11.938	.75	19.050	4.00	101.598
.20	5.080	.48	12.192	.76	19.304	5.00	126.998
.21	5.334	.49	12.446	.77	19.558	6.00	152.397
.22	5.588	.50	12.700	.78	19.812	7.00	177.797
.23	5.842	.51	12.945	.79	20.066	8.00	203.196
.24	6.096	.52	13.208	.80	20.320	9.00	228.596
.25	6.350	.53	13.462	.81	20.574	10.00	253.995
.26	6.604	.54	13.716	.82	20.828	11.00	279.395
.27	6.858	.55	13.970	.83	21.082	12.00	304.794
.28	7.112	.56	14.224	.84	21.336	1 foot	

BOILING POINT OF WATER AT VARIOUS ALTITUDES

Altitude Above Sea Level in Feet	Boiling Point of Water in Degrees Fahrenheit
1,025	212
2,063	210
3,115	208
4,169	206
5,225	204
6,304	202
7,381	200
8,431	198
9,579	196
10,685	194
	192

It is considered good practice to maintain the temperature of the water in an automobile motor cooling system at about 202 degrees Fahrenheit, under normal operating conditions. This allows a working margin, under boiling point, for adverse conditions, such as climbing a long grade, car standing with motor running idle, or running with a retarded spark. Such a system would steam when a car running under normal conditions attained an altitude of about one mile. In cases where steaming occurs under normal conditions, at sea level, mountain climbing is practically impossible or necessitates very frequent stops for water to make up for evaporation.

Index to Tables and Data appears on Pages 27 to 30.

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UNITED STATES OFFICIAL MILLIMETERS CONVERSION TABLE

Millimeters	Equivalent in Inches	Millimeters	Equivalent in Inches
1	0.03,937	51	2.00,787
2	0.07,874	52	2.04,724
3	0.11,811	53	2.08,661
4	0.15,748	54	2.12,598
5	0.19,685	55	2.16,535
6	0.23,622	56	2.20,472
7	0.27,559	57	2.24,409
8	0.31,496	58	2.28,346
9	0.35,433	59	2.32,283
10	0.39,370	60	2.36,220
11	0.43,307	61	2.40,157
12	0.47,244	62	2.44,094
13	0.51,181	63	2.48,031
14	0.55,118	64	2.51,968
15	0 59,055	65	2.55,905
16	0.62,992	66	2.59,842
17	0.66,929	67	2.63,779
18	0.70,866	68	2.67,716
19	0.74,803	69	2·71,653
20	0.78,740	70	2.75,590
21	0.82,677	71	2.79,527
22	0.86,614	72	2.83,464
23	0.90,551	73	2.87,401
24	0.94,488	74	2.91,338
25	0.98,425	75	2.95,275
26	1.02,362	76	2.99,212
27	1.06,299	77	3.03,149
28	1.10,236	78	3.07,086
29	1.14,173	79	3.11,023
30	1.18,110	80	3.14,960
31	1.22,047	81	3.18,897
32	1.25,984	82	3.22,834
33	1.29,921	83	3.26,771
34	1.33,858	84	3.30,708
35	1.37,795	85	3.34,645
36	1.41,732	86	3.38,582
37	1.45,669	87	3.42,519
38	1.49,606	88	3.46,456
39	1.53,543	89	3.50,393
40	1.57,480	90	3.54,330
41	1.61,417	91	3.58,267
42	1.65,354	92	3.62,204
43	1.69,291	93	3.66,141
44	1.73,228	94	3.70,078
45	1.77,165	95	3.74,015
46	1.81,102	96	3.77,952
47	1.85,039	97	3.81,889
48	1.88,976	98	3.85.826
49	1.92,913	99	3.89,76
50	1.96,850	100	3.93 7[illegible]

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POUNDS PER SQUARE INCH IN KILOGRAMMES PER SQUARE CENTIMETRE

Lbs. per Square Inch	Kilo-grammes per Square Centimetre	Lbs. per Square Inch	Kilo-grammes per Square Centimetre	Lbs. per Square Inch	Kilo-grammes per Square Centimetre	Lbs. per Square Inch	Kilo-grammes per Square Centimetre
1	.0703	41	2.8826	81	5.6949	205	14.4129
2	.1406	42	2.9529	82	5.7652	210	14.7645
3	.2109	43	3.0232	83	5.8355	215	15.1160
4	.2812	44	3.0935	84	5.9058	220	15.4675
5	.3515	45	3.1638	85	5.9761	225	15.8191
6	.4218	46	3.2341	86	6.0464	230	16.1706
7	.4921	47	3.3044	87	6.1167	235	16.5221
8	.5624	48	3.3747	88	6.1870	240	16.8737
9	.6328	49	3.4450	89	6.2573	245	17.2252
10	.7031	50	3.5153	90	6.3276	250	17.5767
11	.7734	51	3.5856	91	6.3979	255	17.9283
12	.8437	52	3.6559	92	6.4682	260	18.2798
13	.9140	53	3.7263	93	6.5385	265	18.6313
14	.9843	54	3.7966	94	6.6088	270	18.9829
15	1.0546	55	3.8669	95	6.6722	275	19.3344
16	1.1249	56	3.9372	96	6.7495	280	19.6860
17	1.1952	57	4.0075	97	6.8198	285	20.0375
18	1.2655	58	4.0778	98	6.8901	290	20.3890
19	1.3358	59	4.1481	99	6.9604	295	20.7406
20	1.4062	60	4.2184	100	7.0307	300	21.0921
21	1.4764	61	4.2887	105	7.3822	310	21.7951
22	1.5467	62	4.3590	110	7.7338	320	22.4981
23	1.6171	63	4.4293	115	8.0853	330	23.2012
24	1.6874	64	4.4996	120	8.4368	340	23.9043
25	1.7577	65	4.5699	125	8.7884	350	24.6073
26	1.8280	66	4.6402	130	9.1399	360	25.3104
27	1.8983	67	4.7106	135	9.4914	370	26.0135
28	1.9686	68	4.7809	140	9.8430	380	26.7166
29	2.0389	69	4.8512	145	10.1945	390	27.4196
30	2.1092	70	4.9215	150	10.5460	400	28.1227
31	2.1795	71	4.9918	155	10.8976	410	28.8258
32	2.2498	72	5.0621	160	11.2491	420	29.5288
33	2.3201	73	5.1324	165	11.6006	430	30.2319
34	2.3905	74	5.2027	170	11.9522	440	30.9350
35	2.4607	75	5.2730	175	12.3037	450	31.6380
36	2.5310	76	5.3433	180	12.6553	460	32.3411
37	2.6013	77	5.4136	185	13.0068	470	33.0442
38	2.6717	78	5.4939	190	13.3583	480	33.7437
39	2.7420	79	5.5542	195	13.7099	490	34.4503
40	2.8123	80	5.6246	200	14.0614	500	35.1533

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A CONVENIENT METRIC CONVERSION (*Compiled by C. W. Hunt*)

Millimeters × .03937 = inches.
Millimeters ÷ 25.4 = inches.
Centimeters × .3937 = inches.
Centimeters ÷ 2.54 = inches.
Meters × 39.37 = inches. (Act of Congress.)
Meters × 3.281 = feet.
Meters × 1.094 = yards.
Kilometers × .621 = miles.
Kilometers ÷ 1.6093 = miles.
Kilometers × 3280.8 = feet.
Square Millimeters × .00155 = square inches.
Square Millimeters ÷ 645.2 = square inches.
Square Centimeters × .155 = square inches.
Square Centimeters ÷ 6.452 = square inches.
Square Meters × 10.764 = square feet.
Square Kilometers × 247.1 = acres.
Hectare × 2.471 = acres.
Cubic Centimeters ÷ 16.387 = cubic inches.
Cubic Centimeters ÷ 3.697 = fl. drachms.
Cubic Centimeters ÷ 29.57 = fluid oz.
Cubic Meters × 35.314 = cubic feet.
Cubic Meters × 1.308 = cubic yards.
Cubic Meters × 264.2 = gallons (231 cubic inches).
Liters × 61.023 = cubic inches. (Act of Congress.)
Liters × 33.84 = fluid ounces.
Liters × .2642 = gallons (231 cubic inches).
Liters ÷ 3.78 = gallons (231 cubic inches).
Liters ÷ 28.317 = cubic feet.
Hectoliters × 3.531 = cubic feet.
Hectoliters × 2.838 = bushels (2150.42 cubic inches).
Hectoliters × .1308 = cubic yards.
Hectoliters × 26.42 = gallons (231 cubic inches).
Grammes × 15.432 = grains. (Act of Congress.)
Grammes × 981 = dynes.
Grammes ÷ 28.35 = ounces avoirdupois.
Joule × .7373 = foot pounds.
Kilograms × 2.2046 = pounds.
Kilograms × 35.27 = ounces avoirdupois.
Kilograms ÷ 907.2 = tons (2,000 pounds).
Kilograms per square cent. × 14.223 = pounds per square inch.
Kilogrammeters × 7.233 = foot lbs.
Kilo per Meter × .672 = lbs. per foot.
Kilo per Cu. Meter × .0624 = lbs. per cubic foot.
Kilo-watts × 1.34 = horse-power.
Watts ÷ 746 = horse-power.
Watts × .7373 = ft. pounds per second.
Caloric × 3.968 = B. T. U.
Cheval vapeur × .9863 = horse-power.
(Centigrade × 1.8) × 32 = degree Fahrenheit.
Francs × .193 = dollars.

FRENCH AND AMERICAN EQUIVALENT MEASURES

MEASURES OF LENGTH

French	*United States*
1 meter	39.37 inches, or 3.28083 feet
.3048 meter	1 foot
1 centimeter	.3937 inch
2.54 centimeters	1 inch
1 millimeter	.03937 inch, or 1-25 inch nearly
25.4 millimeters	1 inch
1 kilometer	1093.61 yards, or .62137 mile

(*Continued on page 622*)

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MEASURES OF WEIGHT

1 gramme	15.432 grains
.0648 gramme	1 grain
28.35 grammes	1 ounce avoirdupois
1 kilogramme	2.2046 pounds
.4536 kilogramme	1 pound
1 tonne or metric ton	.9842 ton of 2,240 pounds 19.68 cwt.
1000 kilogrammes	2204.6 pounds

MEASURES OF CAPACITY

Liter (1 cubic decimeter)	61.023 cubic inches .03531 cubic foot .2642 gallon (American) 2.202 pounds water at 62° F.
8.317 liters	1 cubic foot
4.543 liters	1 gallon (British)
3.785 liters	1 gallon (American)

TABLE OF KILOGRAMME CALORIES, EQUIVALENT TO BRITISH THERMAL UNITS

Brit. Th'm'l	0	1	2	3	4	5	6	7	8	9	Brit. Th'm'l
0	.....	.252	.504	.756	1.008	1.260	1.512	1.764	2.016	2.268	0
10	2.52	2.772	3.024	3.276	3.528	3.780	4.032	4.284	4.536	4.788	10
20	5.04	5.292	5.544	5.796	6.048	6.300	6.552	6.804	7.056	7.308	20
30	7.56	7.812	8.064	8.316	8.568	8.820	9.072	9.324	9.576	9.828	30
40	10.08	10.332	10.584	10.836	11.088	11.340	11.592	11.844	12.096	12.348	40
50	12.60	12.852	13.104	13.356	13.608	13.860	14.112	14.364	14.616	14.868	50
50	15.12	15.372	15.624	15.876	16.128	16.380	16.632	16.884	17.136	17.388	60
70	17.64	17.892	18.144	18.396	18.648	18.900	19.152	19.404	19.656	19.908	70
80	20.16	20.412	20.664	20.916	21.168	21.420	21.672	21.924	22.176	22.428	80
90	22.68	22.932	23.184	23.436	23.688	23.940	24.192	24.444	24.696	24.948	90
Brit. Th'm'l	0	1	2	3	4	5	6	7	8	9	Brit. Th'm'l

1 British thermal unit = 251.996 therms, or gramme calories.

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LIST OF NINE DIFFERENT STANDARD GAUGES USED IN THE UNITED STATES

DECIMAL EQUIVALENTS (Inches)

No. of Gauge	American or Brown & Sharpe Iron Wire	Birmingham or Stubbs Iron Wire	Washburn & Moen Iron Wire	Imperial Wire Gauge	U. S. Standard for Plate (Iron & Steel)	Stubbs Steel Wire	Twist Drill and Steel Wire	Washburn & Moen Music Wire	Wood and Machine Screws	No. of Gauge	Fractional Parts of an Inch	Decimal Equiv. of Sixty-fourths, etc.
8-0	.....	.....	.....	.....	.....	.....	This gauge	.0083	....	8-0	1/64	.01563
7-0	.....	.....	.....	.....	.500	.....	from one to	.0087	....	7-0	1/32	.03125
6-0	.....	.....	.....	.464	.469	.....	three thous-	.0095	....	6-0	1/16	.625
5-0	.....	.....	.....	.432	.438	.....	andths larger	.010	....	5-0	5/64	.07813
4-0	.460	.454	.394	.400	.406	.....	than same Nos.	.011	....	4-0	3/32	.09375
3-0	.410	.425	.363	.372	.375	.....	of Stubbs steel	.012	.032	3-0	7/64	.10938
2-0	.365	.380	.331	.348	.344	.....	wire gauge	.013	.045	2-0	1/8	.125
0	.325	.340	.307	.334	.313	.....		.014	.058	0	9/64	.14063
1	.289	.300	.283	.300	.281	.277	.228	.016	.071	1	5/32	.15625
2	.258	.284	.263	.276	.266	.219	.221	.017	.084	2	11/64	.17188
3	.229	.259	.244	.252	.250	.212	.213	.018	.097	3	3/16	.1875
4	.204	.238	.225	.232	.234	.207	.209	.019	.110	4	13/64	.20313
5	.182	.220	.207	.212	.219	.204	.206	.020	.124	5	7/32	.21875
6	.162	.203	.192	.192	.203	.201	.204	.022	.137	6	15/64	.23438
7	.144	.180	.177	.176	.188	.199	.201	.023	.150	7	1/4	.25
8	.128	.165	.162	.160	.172	.197	.199	.024	.163	8	17/64	.26563
9	.114	.148	.148	.144	.156	.194	.196	.026	.176	9	9/32	.28125
10	.102	.134	.135	.128	.141	.191	.194	.027	.189	10	19/64	.29688
11	.091	.120	.121	.116	.125	.188	.191	.028	.203	11	5/16	.3125
12	.081	.109	.106	.104	.109	.185	.189	.030	.216	12	21/64	.32813
13	.072	.095	.092	.092	.094	.182	.185	.031	.229	13	11/32	.34375
14	.064	.083	.080	.080	.078	.180	.182	.033	.242	14	23/64	.35938
15	.057	.072	.072	.072	.070	.178	.180	.035	.255	15	3/8	.375
16	.051	.065	.063	.064	.063	.175	.177	.036	.268	16	25/64	.39063
17	.045	.058	.054	.056	.056	.172	.173	.038	.282	17	13/32	.40625
18	.040	.049	.048	.048	.050	.168	.170	.040	.295	18	27/64	.42188
19	.036	.042	.041	.040	.044	.164	.166	.041	.308	19	7/16	.4375
20	.032	.035	.035	.036	.038	.161	.161	.043	.321	20	29/64	.45313
21	.028	.032	.032	.032	.034	.157	.159	.046	.334	21	15/32	.46875
22	.025	.028	.029	.028	.031	.155	.157	.048	.347	22	31/64	.48438
23	.023	.025	.026	.024	.028	.153	.154	.051	.360	23	1/2	.5
24	.020	.022	.023	.022	.025	.151	.152	.055	.374	24	33/64	.51563
25	.018	.020	.020	.020	.022	.148	.150	.059	.387	25	17/32	.53125
26	.016	.018	.018	.018	.019	.146	.147	.063	.400	26	35/64	.54688
27	.0141	.016	.0173	.0164	.0171	.143	.144	.066	.413	27	9/16	.5625
28	.0126	.014	.0162	.0149	.0156	.139	.141	.072	.426	28	37/64	.57813
29	.0112	.013	.015	.0136	.014	.134	.136	.076	.439	29	19/32	.59375
30	.010	.012	.014	.0124	.0125	.127	.129	.080	.453	30	39/64	.60938
31	.0089	.010	.0132	.0116	.0109	.120	.120	....	.466	31	5/8	.625
32	.0079	.009	.0128	.0108	.0101	.115	.116	....	.479	32	41/64	.64063
33	.007	.008	.0118	.010	.0093	.112	.113	....	.492	33	21/32	.65625
34	.0063	.007	.0104	.0092	.0085	.110	.111	....	.505	34	43/64	.67188
35	.0056	.005	.0095	.0084	.0078	.108	.110	....	.518	35	11/16	.6875
36	005	.004	.009	.0076	.007	.106	.1065	....	.532	36	45/64	.70313
37	.0044	.....	.....	.0068	.0066	.103	.104	....	.545	37	23/32	.71875
38	.0039	.....	.....	.006	.0062	.101	.1015	....	.558	38	47/64	.73438
39	.0035	.....	.....	.0052	.....	.099	.0995	....	.571	39	3/4	.75
40	.0031	.....	.....	.0048	.....	.097	.098	....	.584	40	49/64	.76563
41	.....	.....	.....	.....	.....	.095	.096	....	.597	41	25/32	.78125
42	.....	.....	.....	.....	.....	.092	.094	....	.611	42	51/64	.79688
43	.....	.....	.....	.....	.....	.088	.089	....	.624	43	13/16	.8125
44	.....	.....	.....	.....	.....	.085	.086	....	.637	44	53/64	.82813
45	.....	.....	.....	.....	.....	.081	.082	....	.650	45	27/32	.84375
46	.....	.....	.....	.....	.....	.079	.081	....	.663	46	55/64	.85938
47	.....	.....	.....	.....	.....	.077	.079	....	.676	47	7/8	.875
48	.....	.....	.....	.....	.....	.075	.076	....	.690	48	57/64	.89063
49	.....	.....	.....	.....	.....	.072	.073	....	.703	49	29/32	.90625
50	.....	.....	.....	.....	.....	.069	.070	....	.716	50	59/64	.92188

Letter Sizes Stubbs Steel Wire

A	.234	I	.272	R	.339
B	.238	J	.277	S	.348
C	.242	K	.281	T	.358
D	.246	L	.290	U	.368
E	.250	M	.295	V	.377
F	.257	N	.302	W	.386
G	.261	O	.316	X	.397
H	.266	P	.323	Y	.404
		Q	.332	Z	.413

Index to Tables and Data appears on Pages 37 to 30.

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SIZES OF NUMBERS OF THE UNITED STATES STANDARD GAUGE FOR SHEET AND PLATE IRON AND STEEL

An Act Establishing a Standard Gauge for Sheet and Plate Iron and Steel

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled: That for the purpose of securing uniformity the following is established as the only gauge for sheet and plate iron and steel in the United States of America namely:

Number of Gauge	Approximate Thickness in Fractions of an Inch	Approximate Thickness in Decimal Parts of an Inch	Weight per Square Foot in Ounces Avoirdupois	Weight per Square Foot in Pounds Avoirdupois
0000000	1/2	.5	320	20.00
000000	15/32	.46875	300	18.75
00000	7/16	.4375	280	17.50
0000	13/32	.40625	260	16.25
000	3/8	.375	240	15.00
00	11/32	.34375	220	13.75
0	5/16	.3125	200	12.50
1	9/32	.28125	180	11.25
2	17/64	.265625	170	10.625
3	1/4	.25	160	10.00
4	15/64	.234375	150	9.375
5	7/32	.21875	140	8.75
6	13/64	.203125	130	8.125
7	3/16	.1875	120	7.5
8	11/64	.171875	110	6.875
9	5/32	.15625	100	6.25
10	9/64	.140625	90	5.625
11	1/8	.125	80	5.00
12	7/64	.109375	70	4.375
13	3/32	.09375	60	3.75
14	5/64	.078125	50	3.125
15	9/128	.0703125	45	2.8125
16	1/16	.0625	40	2.5
17	9/160	.05625	36	2.25
18	1/20	.05	32	2.
19	7/160	.04375	28	1.75
20	3/80	.0375	24	1.50
21	11/320	.034375	22	1.375
22	1/32	.03125	20	1.25
23	9/320	.028125	18	1.25
24	1/40	.025	16	1.
25	7/320	.021875	14	.875
26	3/160	.01875	12	.75
27	11/640	.0171875	11	.6875
28	1/64	.015625	10	.625
29	9/640	.0140625	9	.5625
30	1/80	.0125	8	.5
31	7/640	.0109375	7	.4375
32	13/1280	.01015625	6½	.40625
33	3/320	.009375	6	.375
34	11/1280	.00859375	5½	.34375
35	5/640	.0078125	5	.3125
36	9/1280	.00703125	4½	.28125
37	17/2560	.006640625	4¼	.265625
38	1/160	.00625	4	.25

And on and after July first, eighteen hundred and ninety-three, the same and no other shall be used in determining duties and taxes levied by the United States of America on sheet and plate iron and steel. But this act shall not be construed to increase duties upon any articles which may be imported.

Sec. 3.—That in the practical use and application of the standard gauge hereby established a variation of two and one-half per cent. either way may be allowed.

Approved March 3. 1893.

Index to Tables and Data appears on Pages 27 to 30.

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THERMOMETER SCALES

There are two thermometer scales in general use in the United States: Fahrenheit and Centigrade. In the Fahrenheit thermometer the temperature of melting ice is taken at 32 degrees and boiling point at 212 degrees; thus there are 180 degrees between the two extremes. In the Centigrade thermometer the distance between these two points on the scale is divided into exactly 100 degrees. In order to convert degrees Fahrenheit into degrees Centigrade: Subtract 32, multiply the remainder by 5, and divide by 9. Thus, convert 158 degrees Fahrenheit to degrees Centigrade:

$$\text{Then } (158-32)\frac{5}{9}=70^\circ \text{ Cent.}$$

Or to convert degrees Centigrade into degrees Fahrenheit: Multiply by 9, divide by 5 and add 32. Thus, convert 70 degrees Centigrade into degrees Fahrenheit:

$$\text{Then } (70\times\frac{9}{5})+32=158^\circ \text{ Fahr.}$$

Following is a table giving the equivalent degrees of the Fahrenheit and Centigrade scales, from 1 to 100 Centigrade:

Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.
0	*32.0	35	95.0	70	158.0
1	33.8	36	96.8	71	159.8
2	35.6	37	98.6	72	161.6
3	37.4	38	100.4	73	163.4
4	39.2	39	102.2	74	165.2
5	41.0	40	104.0	75	167.0
6	42.8	41	105.8	76	168.8
7	44.6	42	107.6	77	170.6
8	46.4	43	109.4	78	172.4
9	48.2	44	111.2	79	174.2
10	50.0	45	113.0	80	176.0
11	51.8	46	114.8	81	177.8
12	53.6	47	116.6	82	179.6
13	55.4	48	118.4	83	181.4
14	57.2	49	120.2	84	183.2
15	59.0	50	122.0	85	185.0
16	60.8	51	123.8	86	186.8
17	62.6	52	125.6	87	188.6
18	64.4	53	127.4	88	190.4
19	66.2	54	129.2	89	192.2
20	68.0	55	131.0	90	194.0
21	69.8	56	132.8	91	195.8
22	71.6	57	134.6	92	197.6
23	73.4	58	136.4	93	199.4
24	75.2	59	138.2	94	201.2
25	77.0	60	140.0	95	203.0
26	78.8	61	141.8	96	204.8
27	80.6	62	143.6	97	206.6
28	82.4	63	145.4	98	208.4
29	84.2	64	147.2	99	210.2
30	86.0	65	149.0	100	†212.0
31	87.8	66	150.8	..	.....
32	89.6	67	152.6	..	.....
33	91.4	68	154.4	..	.....
34	93.2	69	156.2	..	.....

* Freezing point.
† Boiling point.

It will be noticed that for each degree Centigrade the Fahrenheit scale rises 1.8 degrees, so that if we multiply the degrees Centigrade by 1.8 and add 32 we will get the equivalent number of degrees Fahrenheit. In the Fahrenheit thermometer the freezing and boiling points of water are taken at the mean atmospheric pressure at the sea level, 14.7 pounds to the square inch.

Index to Tables and Data appears on Pages 27 to 30.

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FORMULAS FOR CONVERSION OF THERMOMETER SCALES

To convert degrees, Centigrade or Réaumur, into degrees Fahrenheit·
Let F = No. of degrees Fahrenheit.
C = " " " Centigrade.
R = " " " Réaumur.

$$F = \frac{9C}{5} + 32; \qquad F = \frac{9R}{4} + 32;$$

$$C = \frac{5\,(F - 32)}{9} \qquad R = \frac{4\,(F - 32)}{9}$$

Freezing point, or 32° Fah. = zero in Cent. or Réaumur.
Boiling point, or 212° Fah. = 100° Cent., or 80° Réaumur.

BAUME HYDROMETER AND SPECIFIC GRAVITY EQUIVALENTS

(*American Standard*)

For liquids heavier than water,

$$\text{Sp. Gr.} = \frac{145}{145 - {}^\circ\text{Bé}} \text{ at } 60^\circ \text{ F.}$$

Baumé	Specific Gravity	Baumé	Specific Gravity	Baumé	Specific Gravity
0.0	1.000	17.5	1.137	35.0	1.318
0.5	1.003	18.0	1.141	36.0	1.330
1.0	1.006	18.5	1.146	37.0	1.342
1.5	1.010	19.0	1.150	38.0	1.355
2.0	1.014	19.5	1.155	39.0	1.367
2.5	1.017	20.0	1.160	40.0	1.381
3.0	1.021	20.5	1.164	45.0	1.450
3.5	1.024	21.0	1.169	50.0	1.526
4.0	1.028	21.5	1.174	55.0	1.611
4.5	1.032	22.0	1.178	60.0	1.705
5.0	1.035	22.5	1.183	65.0	1.812
5.5	1.039	23.0	1.188	70.0	1.933
6.0	1.043	23.5	1.193	....	.....
6.5	1.046	24.0	1.198	....	....
7.0	1.050	24.5	1.203	....	....
7.5	1.054	25.0	1.208	....	....
8.0	1.058	25.5	1.213	....	....
8.5	1.062	26.0	1.218	....	.....
9.0	1.066	26.5	1.223	....	....
9.5	1.070	27.0	1.228	....	....
10.0	1.074	27.5	1.234	....	....
10.5	1.078	28.0	1.239	....	.....
11.0	1.082	28.5	1.244	....	.....
11.5	1.086	29.0	1.250	....	....
12.0	1.090	29.5	1.255	....	.....
12.5	1.094	30.0	1.260	....	....
13.0	1.098	30.5	1.266	....	....
13.5	1.102	31.0	1.271	....	....
14.0	1.106	31.5	1.277	....	....
14.5	1.111	32.0	1.283	....	.....
15.0	1.115	32.5	1.288	....	....
15.5	1.119	33.0	1.294	....	.....
16.0	1.124	33.5	1.300	....	.....
16.5	1.128	34.0	1.306	....	.....
17.0	1.132	34.5	1.312	....	.....

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WEIGHTS OF METALS

	Lbs. per Cu. Ft.	Lbs. per Cu. In.
Aluminum, cast	160	.0926
Brass, cast	506.3	.293
Brass, sheet	528	.3056
Babbitt metal	440.6	.255
Bronze, aluminum	471.2	.2727
Bronze, phosphor	575.8	.3332
Copper wire	555.1	.3212
Cast iron	450.	.2604
Wrought iron, bars	486.8	.2817
Steel, Bessemer	490.7	.284
Lead, cast	709.5	.4106
Nickel	548.7	.3175
Tin	458.3	.2652
Zinc	436.5	.2526

MELTING POINTS OF METALS

Cast iron	2210	deg.	Fahr
Wrought iron	2912	"	"
Steel	2500	"	"
Copper	2160	"	"
Brass	1900	"	"
Aluminum (pure)	1112	"	"
Lead	608	"	"
Tin	446	"	"

PROPORTIONATE WEIGHT OF CASTINGS TO WEIGHT OF WOOD PATTERNS

A Pattern Weighing One Pound, Made of (Less Weight of Core Prints)	Cast Iron	Brass	Copper	Bronze	Bell Metal	Zinc
Pine or Fir	16	15.8	16.7	16.3	17.1	13.5
Oak	9	10.1	10.4	10.3	10.9	8.6
Beech	9.7	10.9	11.4	11.3	11.9	9.1
Linden	13.4	15.1	16.7	15.5	16.3	12.9
Pear	10.2	11.5	11.9	11.8	12.4	9.8
Birch	10.6	11.9	12.3	12.2	12.9	10.2
Alder	12.8	14.3	14.9	14.7	15.5	12.2
Mahogany	11.7	13.2	13.7	13.5	14.2	11.2
Brass	0.85	0.95	0.99	0.98	1.0	0.81

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WEIGHT OF STEEL PER LINEAL FOOT

FLAT SIZES

	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½	1¾	2	2¼	2½	2¾	3	3½	4	5	6	7
⅛	.213	.266	.320	.372	.426	.479	.530	.585	.640	.745	.850	.955	1.07	1.18	1.28	1.49	1.70	2.13	2.56	2.98
3/16	.319	.399	.480	.558	.639	.718	.790	.878	.960	1.12	1.28	1.43	1.60	1.76	1.92	2.24	2.55	3.20	3.83	4.47
¼	.425	.533	.640	.743	.852	.958	1.06	1.17	1.28	1.49	1.70	1.91	2.13	2.34	2.56	2.98	3.40	4.26	5.11	5.96
5/16	.531	.665	.800	.929	1.06	1.20	1.33	1.46	1.60	1.86	2.13	2.39	2.66	2.92	3.19	3.72	4.25	5.32	6.38	7.44
⅜	.638	.798	.960	1.12	1.28	1.43	1.59	1.75	1.91	2.23	2.55	2.87	3.20	3.51	3.83	4.46	5.10	6.40	7.66	8.92
7/16	.744	.931	1.12	1.30	1.49	1.67	1.86	2.05	2.23	2.60	2.98	3.35	3.72	4.09	4.46	5.21	5.95	7.44	8.92	10.40
½	.....	1.07	1.28	1.49	1.70	1.91	2.13	2.34	2.55	2.98	3.40	3.83	4.26	4.68	5.10	5.96	6.80	8.52	10.20	11.90
9/16	.....	1.20	1.44	1.67	1.91	2.15	2.39	2.63	2.87	3.35	3.83	4.30	4.78	5.26	5.74	6.69	7.65	9.56	11.50	13.40
⅝	.....	.....	1.60	1.86	2.12	2.39	2.66	2.92	3.19	3.72	4.26	4.79	5.32	5.86	6.39	7.44	8.52	10.64	12.78	14.90
11/16	.....	.....	1.76	2.04	2.34	2.63	2.92	3.22	3.51	4.09	4.68	5.26	5.84	6.43	7.01	8.18	9.35	11.70	14.00	16.40
¾	.....	.....	.....	2.23	2.55	2.86	3.19	3.50	3.83	4.46	5.10	5.74	6.40	7.02	7.65	8.92	10.20	12.80	15.30	17.90
13/16	.....	.....	.....	2.41	2.76	3.11	3.45	3.80	4.14	4.83	5.53	6.22	6.91	7.60	8.29	9.67	11.10	13.80	16.60	19.30
⅞	.....	.....	.....	.....	2.98	3.34	3.72	4.09	4.46	5.21	5.96	6.70	7.46	8.19	8.94	10.42	11.92	14.87	17.88	20.80
15/16	.....	.....	.....	.....	3.19	3.59	3.98	4.38	4.78	5.58	6.38	7.17	7.97	8.77	9.56	11.20	12.80	15.90	19.10	22.40
1	.....	.....	.....	.....	.....	3.82	4.25	4.68	5.10	5.96	6.80	7.66	8.52	9.36	10.20	11.92	13.60	17.04	20.40	23.80
1⅛	.....	.....	.....	.....	.....	.....	4.78	5.27	5.74	6.71	7.65	8.61	9.59	10.54	11.48	13.41	15.30	19.17	22.95	26.80
1¼	.....	.....	.....	.....	.....	.....	.....	5.85	6.38	7.45	8.50	9.57	10.65	11.71	12.76	14.90	17.00	21.30	25.61	29.76
1½	.....	.....	.....	.....	.....	.....	.....	7.02	7.67	8.94	10.20	11.49	12.78	14.04	15.30	17.88	20.40	25.56	30.60	35.70

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WEIGHT IN POUNDS OF SHEET AND BAR ALUMINUM, BRASS AND STEEL

Thickness or Diam. in Inch		Sheets per Square Foot			Square Bars, One Foot Long			Round Bars, One Foot Long		
Fraction	Dec.	Alum.	Brass	Steel	Alum.	Brass	Steel	Alum.	Brass	Steel
1/16	.0625	.869	2.77	2.52	.004	.014	.013	.003	.011	.010
1/8	.125	1.739	5.55	5.10	.018	.057	.053	.014	.047	.042
3/16	.1875	2.609	8.32	7.65	.041	.131	.119	.032	.102	.094
1/4	.2500	3.479	11.10	10.20	.072	.230	.212	.057	.182	.167
5/16	.3125	4.348	13.87	12.75	.114	.380	.333	.089	.284	.261
3/8	.3750	5.218	16.64	15.30	.163	.520	.478	.128	.408	.375
7/16	.4375	6.088	19.42	17.85	.222	.708	.651	.174	.555	.511
1/2	.5000	6.958	22.20	20.40	.290	.925	.850	.227	.724	.667
9/16	.5625	7.827	24.97	22.95	.367	1.171	1.076	.288	.919	.845
5/8	.6250	8.697	27.74	25.50	.453	1.445	1.328	.356	1.136	1.043
11/16	.6875	9.567	30.52	28.05	.548	1.748	1.608	.430	1.372	1.262
3/4	.7500	10.436	33.29	30.60	.652	2.080	1.913	.516	1.646	1.502
13/16	.8125	11.306	36.07	33.15	.766	2.445	2.245	.601	1.917	1.763
7/8	.8750	12.175	38.84	35.70	.888	2.833	2.603	.697	2.223	2.044
15/16	.9375	13.045	41.61	38.25	1.019	3.251	2.989	.800	2.552	2.347
1	1.0000	13.915	44.39	40.80	1.159	3.697	3.400	.911	2.906	2.670
1 1/16	1.0625	14.784	47.16	43.35	1.309	4.176	3.838	1.028	3.279	3.014
1 1/8	1.125	15.654	49.94	45.90	1.467	4.630	4.303	1.152	3.675	3.379
1 3/16	1.1875	16.524	52.71	48.45	1.635	5.216	4.795	1.284	4.096	3.766
1 1/4	1.2500	17.394	55.48	51.00	1.812	5.780	5.312	1.423	4.539	4.173
1 5/16	1.3125	18.263	58.26	53.55	1.997	6.370	5.857	1.569	5.003	4.600
1 3/8	1.3750	19.133	61.04	56.10	2.192	6.692	6.428	1.722	5.491	5.049
1 7/16	1.4375	20.002	63.81	58.65	2.396	7.644	7.026	1.882	6.002	5.518
1 1/2	1.5000	20.872	66.58	61.20	2.609	8.322	7.650	2.049	6.536	6.008
1 9/16	1.5625	21.741	69.35	63.75	2.831	9.030	8.301	2.223	7.091	6.520
1 5/8	1.6250	22.611	72.13	66.30	3.062	9.768	8.978	2.405	7.672	7.051
1 11/16	1.6875	23.481	74.90	68.85	3.302	10.53	9.682	2.593	8.271	7.604
1 3/4	1.7500	24.350	77.67	71.40	3.550	11.32	10.41	2.789	8.896	8.178
1 13/16	1.8125	25.250	80.54	73.95	3.810	12.15	11.17	2.992	9.544	8.773
1 7/8	1.8750	26.090	83.22	76.50	4.075	13.00	11.95	3.202	10.21	9.388
1 15/16	1.9375	26.960	86.00	79.05	4.352	13.88	12.76	3.417	10.90	10.02
2	2.0000	27.829	88.77	81.60	4.638	14.79	13.60	3.642	11.62	10.68

WEIGHT OF ALUMINUM, IRON, COPPER, BRASS AND LEAD BALLS

Dia. In.	Alum., Lbs.	Iron, Lbs.	Copper, Lbs.	Brass, Lbs.	Lead, Lbs.	Dia., In.	Alum. Lbs.	Iron, Lbs.	Copper Lbs.	Brass, Lbs.	Lead, Lbs.
1	.045	.136	.166	.158	.214	7	15.58	46.76	57.1	54.5	73.7
1½	.153	.46	.562	.537	.727	7½	19.17	57.52	70.0	67.11	90.0
2	.363	1.09	1.3	1.25	1.7	8	23.27	69.81	85.2	81.4	110.1
2½	.710	2.13	2.60	2.50	3.35	8½	27.91	83.73	102.3	100.0	132.3
3	1.22	3.68	4.5	4.3	5.8	9	33.10	99.4	121.3	115.9	156.7
3½	1.94	5.84	7.14	6.82	9.23	9½	38.90	116.9	143.0	136.4	184.7
4	2.90	8.72	10.7	10.2	13.8	10	45.45	136.35	166.4	159.0	215.0
4½	3.13	12.42	15.25	14.5	19.6	10½	52.60	157.84	193.0	184.0	250.0
5	5.68	17.04	20.8	19.9	26.9	11	60.49	181.48	221.8	211.8	286.7
5½	7.56	22.68	27.74	26.47	36.0	11½	69.12	207.37	253.5	242.0	327.7
6	9.81	29.45	35.9	34.3	46.4	12	78.54	235.62	288.1	275.0	372.[illegible]
6½	12.48	37.44	45.76	43.67	59.13						

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INTERNATIONAL (METRIC SYSTEM) STANDARD 60° THREAD

Diameter of Screw	Pitch	Diameter at Root of Thread	Width of Flat at Top and Bottom of Thread
Millimetres	*Millimetres*	*Millimetres*	*Millimetres*
3	.5	2.35	.06
4	.75	3.03	.09
5	.75	4.03	.09
6	1.0	4.70	.13
7	1.0	5.70	.13
8	1.0	6.70	.13
8	1.25	6.38	.16
9	1.0	7.70	.13
9	1.25	7.38	.16
10	1.5	8.05	.19
11	1.5	9.05	.19
12	1.5	10.05	.19
12	1.75	9.73	.22
14	2.0	11.40	.25
16	2.0	13.40	.25
18	2.5	14.75	.31
20	2.5	16.75	.31
22	2.5	18.75	.31
22	3.0	18.10	.38
24	3.0	20.10	.38
26	3.0	22.10	.38
27	3.0	23.10	.38
28	3.0	24.10	.38
30	3.5	25.45	.44
32	3.5	27.45	.44
33	3.5	28.45	.44
34	3.5	29.45	.44
36	4.0	30.80	.5
38	4.0	32.80	.5
39	4.0	33.80	.5
40	4.0	34.80	.5
42	4.5	36.15	.56
44	4.5	38.15	.56
45	4.5	39.15	.56
46	4.5	40.15	.56
48	5.0	41.51	.63
50	5.0	43.51	.62
52	5.0	45.51	.63

NOTE.—This thread is largely used by Italian constructors.

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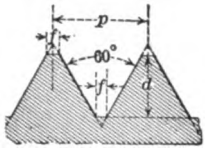
UNITED STATES 60° SCREW THREAD



Formula
$$\begin{cases} p = \text{pitch} = \dfrac{1}{\text{No. threads per inch}} \\ d = \text{depth} = p \times .6495 \\ f = \text{flat} = \dfrac{p}{8} \end{cases}$$

Diameter of Screw	Threads to Inch	Diameter at Root of Thread	Width of Flat
1/4	20	.185	.0063
5/16	18	.2403	.0069
3/8	16	.2936	.0078
7/16	14	.3447	.0089
1/2	13	.4001	.0096
9/16	12	.4542	.0104
5/8	11	.5069	.0114
3/4	10	.6201	.0125
7/8	9	.7307	.0139
1	8	.8376	.0156
1 1/8	7	.9394	.0179
1 1/4	7	1.0644	.0179
1 3/8	6	1.1585	.0208
1 1/2	6	1.2835	.0208
1 5/8	5 1/2	1.3888	.0227
1 3/4	5	1.4902	.0250
1 7/8	5	1.6152	.0250
2	4 1/2	1.7113	.0278
2 1/4	4 1/2	1.9613	.0278
2 1/2	4	2.1752	.0313
2 3/4	4	2.4252	.0313
3	3 1/2	2.6288	.0357
3 1/4	3 1/2	2.8788	.0357
3 1/2	3 1/4	3.1003	.0385
3 3/4	3	3.3170	.0417
4	3	3.5670	.0418
4 1/4	2 7/8	3.7982	.0455
4 1/2	2 3/4	4.0276	.0455
4 3/4	2 5/8	4.2551	.0476
5	2 1/2	4.4804	.0500
5 1/4	2 1/2	4.7304	.0500
5 1/2	2 3/8	4.9530	.0526
5 3/4	2 3/8	5.2030	.0526
6	2 1/4	5.4226	.0556

Standard Proportions for Machine Screws

The report of the committee on standard proportions for machine screws of the American Society of Mechanical Engineers is published in the October, 1906, proceedings of the society. The report is substantially in agreement with the recommendations adopted at the joint meeting held in New York, April 11, 1904.

The committee believes the following combined details to be essential in establishing and maintaining a standard for the diameters, threads and heads of machine screws, including, as it does, diameters, threads and limits for the taps which are to be used in connection therewith: (*a*) form of thread, (*b*) diameters, (*c*) number of threads per inch, (*d*) standard reference thread gauges, basic and for screws and taps, (*e*) working gauges for screws and taps, (*f*) limits of variation, measured in the angle of the thread, (*g*) limits of variation in external diameter, (*h*) limits of variation in the pitch of the thread screws and taps, (*k*) proportions of the heads.

Index to Tables and Data appears on Pages 27 to 30.

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DIMENSIONS OF SQUARE AND HEXAGON BOLT HEADS AND SIZE OF STOCK REQUIRED

UNITED STATES STANDARD SIZES

Diameter	Distance Across Flats, Square and Hexagon	Distance Across Corners, Hexagon	Thickness of Head	Stock for Square Head	Stock for Hexagon Head	Diameter
Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
1/4	1/2	9/16	1/4	1 9/32	1 3/32	1/4
3/8	11/16	25/32	11/32	1 1/2	1 1/4	3/8
1/2	7/8	1	7/16	1 23/32	1 1/2	1/2
5/8	1 1/16	1 7/32	17/32	2	1 11/16	5/8
3/4	1 1/4	1 7/16	5/8	2 7/32	1 15/16	3/4
7/8	1 7/16	1 21/32	21/32	2 1/2	2 5/32	7/8
1	1 5/8	1 7/8	13/16	2 3/4	2 3/8	1
1 1/8	1 13/16	2 3/32	29/32	3	2 19/32	1 1/8
1 1/4	2	2 5/16	1	3 1/4	2 27/32	1 1/4
1 3/8	2 3/16	2 1/2	1 3/32	3 9/16	3	1 3/8
1 1/2	2 3/8	2 3/4	1 3/16	3 13/16	3 5/16	1 1/2
1 5/8	2 9/16	2 15/16	1 9/32	4 1/16	3 1/2	1 5/8
1 3/4	2 3/4	3 3/16	1 3/8	4 3/8	3 3/4	1 3/4
1 7/8	2 15/16	3 13/32	1 15/32	4 5/8	4	1 7/8
2	3 1/8	3 5/8	1 9/16	4 7/8	4 1/4	2
2 1/4	3 1/2	4 1/16	1 3/4	5 7/16	4 25/32	2 1/4
2 1/2	3 7/8	4 1/2	1 15/16	5 15/16	5 3/16	2 1/2
2 3/4	4 1/4	4 7/8	2 1/8	6 7/16	5 1/2	2 3/4
3	4 5/8	5 11/32	2 5/16	7	6 1/16	3

MANUFACTURERS' STANDARD SIZES

Diameter	Distance Across Flats, Square	Distance Across Flats, Hexagon	Thickness of Head	Stock for Square Head	Stock for Hexagon Head	Diameter
Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
1/4	3/8	7/16	3/16	17/32	23/32	1/4
3/8	9/16	5/8	9/32	13/16	15/16	3/8
1/2	3/4	13/16	3/8	1 1/16	1 3/32	1/2
5/8	15/16	1	15/32	1 11/32	1 13/32	5/8
3/4	1 1/8	1 3/16	9/16	1 5/8	1 9/16	3/4
7/8	1 5/16	1 3/8	21/32	1 7/8	1 7/8	7/8
1	1 1/2	1 9/16	3/4	2 5/32	2 1/32	1
1 1/8	1 11/16	1 3/4	27/32	2 13/32	2 7/32	1 1/8
1 1/4	1 7/8	1 15/16	15/16	2 11/16	2 7/16	1 1/4
1 3/8	2 1/16	2 1/8	1 1/16	3 1/32	2 27/32	1 3/8
1 1/2	2 1/4	2 5/16	1 1/8	3 7/32	3	1 1/2
1 5/8	2 7/16	2 1/2	1 1/4	3 19/32	3 1/4	1 5/8
1 3/4	2 5/8	2 11/16	1 5/16	3 3/4	3 15/32	1 3/4
1 7/8	2 13/16	2 7/8	1 7/16	4 3/32	3 23/32	1 7/8
2	3	3 1/16	1 1/2	4 5/16	4	2
2 1/4	3 3/8	3 7/16	1 3/4	5	4 9/16	2 1/4
2 1/2	3 3/4	3 13/16	1 7/8	5 3/8	4 13/16	2 1/2
2 3/4	4 1/8	4 3/16	2 1/16	5 29/32	5 3/8	2 3/4
3	4 1/2	4 9/16	2 1/4	6 7/32	5 11/16	3

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De Palma

whose record of victories stands second to no other driver, always uses

Monogram Oil

He attributes no small part of his success to the use of same—and has had no trouble from faulty lubrication in any of the events in which he has participated.

Manufactured by

New York Lubricating Oil Company

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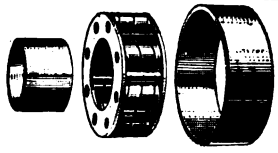
Columbia Lubricants Co. of New York

116 Broad Street New York



The Component Parts of a Hyatt Quiet Bearing.

The small or inner race, on which the rollers operate, is made of special analysis alloy steel, heat treated and ground.

The cage contains the flexible spiral rollers that cushion road shocks, reduce noise, adjust irregularities in alignment and assure full line contact for the load. Rollers made of heat treated chrome nickel steel.

The large or outer race is made of the same material as the inner race and is mounted in the bearing housing.

The use of Hyatt Roller Bearings in your car insures dependable bearing service.

Two books, one about motorcar bearings in general for prospective purchasers, the other for automobile owners, will be sent on request

"Hyatt Quiet Bearings"

HYATT ROLLER BEARING CO.
DETROIT, CHICAGO
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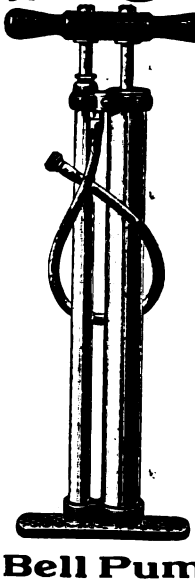
The Hyatt Engineering Department in Detroit is always at your service.

BELL Expanding Plunger PUMPS



REAL AIR COMPRESSORS

As the patent Expanding Plunger is forced downwards it automatically fills the entire barrel, driving out every particle of air. Therefore no waste motion.

Save half the work of inflation.

Tire Pumps, Oil and Grease Guns and all accessories. Catalog on request.

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Bell Pump & Mfg. Co.

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UNITED STATES STANDARD BOLTS AND NUTS

Diameter of Bolt Inches	Area at Bottom of Thread	Tensile Strength at 10,000 Pounds per Square Inch	Threads per Inch	Thickness of Head.	Thickness of Nut	Short Diameter Square or Hexagon Head or Nut	Long Diameter Square Head or Nut	Long Diameter Hexagon Head or Nut	Weight Each Square Nut	Weight Each Hexagon Nut	Weight per 100 Square Nuts	Weight per 100 Hexagon Nuts	Weight per Inch Length of Bolt
1/4	.0269	269	20	1/4	1/4	1/2	11/16	9/16	.0138	.0131	1.38	1.31	.0136
5/16	.0454	454	18	19/64	5/16	19/32	13/16	11/16	.0231	.0192	2.31	1.92	.0213
3/8	.0678	678	16	11/32	3/8	11/16	1	13/16	.0426	.0333	4.26	3.33	.0306
7/16	.0933	933	14	25/64	7/16	25/32	1 1/8	7/8	.0613	.0500	6.13	5.00	.0417
1/2	.1257	1,257	13	7/16	1/2	7/8	1 1/4	1	.0893	.0700	8.93	7.00	.0545
5/8	.2018	2,018	11	17/32	5/8	1 1/16	1 1/2	1 1/4	.1560	.1350	15.60	13.50	.0852
3/4	.3020	3,020	10	5/8	3/4	1 1/4	1 3/4	1 7/16	.2630	.2220	26.30	22.20	.1227
7/8	.4193	4,193	9	23/32	7/8	1 7/16	2 1/16	1 11/16	.3570	.3240	35.70	32.40	.1670
1	.5510	5,510	8	13/16	1	1 5/8	2 5/16	1 7/8	.5880	.4630	58.80	46.30	.2181
1 1/8	.6931	6,931	7	29/32	1 1/8	1 13/16	2 9/16	2 1/16	.7690	.6760	76.90	67.60	.2760
1 1/4	.8899	8,899	7	1	1 1/4	2	2 13/16	2 5/16	1.04	.9010	104	90.10	.3410
1 3/8	1.0541	10,541	6	1 3/32	1 3/8	2 3/16	3 1/8	2 1/2	1.43	1.18	143	118	.4120
1 1/2	1.2938	12,938	6	1 3/16	1 1/2	2 3/8	3 3/8	2 3/4	1.72	1.47	172	147	.4900
1 3/4	1.7441	17,441	5	1 3/8	1 3/4	2 3/4	3 7/8	3 3/16	2.94	2.50	294	250	.6680
2	2.3001	23,001	4 1/2	1 9/16	2	3 1/8	4 7/16	3 5/8	4.35	3.45	435	345	.8720

TABLE OF RIVETS IN 100 POUNDS
APPROXIMATE NUMBER

Length Rivets	Diameter of Rivets											
	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	11/16	3/4	7/8	1
1/2	17500	15900	8000	5100	3200	1900	.....	.....	.....	.....	.....	....
5/8	16000	13800	7000	4500	2900	1800	.....	.....	.....	.....	.....	....
3/4	14400	12200	6300	4100	2373	1476	1103	642	.....	.....	.....	....
7/8	13500	10900	5700	3700	2190	1371	1030	604	.....	.....	.....	....
1	12600	9800	5200	3400	2034	1280	968	571	400	345	.....	....
1 1/8	11600	9000	4700	3100	1898	1200	910	541	382	322	208	....
1 1/4	10800	8300	4400	2900	1780	1129	862	514	365	311	206	....
1 3/8	10000	7600	4100	2700	1675	1066	815	489	350	295	204	....
1 1/2	9300	7100	4000	2500	1582	1010	776	462	335	284	201	....
1 5/8	8700	.....	3800	2300	1498	960	740	446	324	275	199	132
1 3/4	8100	6300	3500	2200	1424	914	707	428	311	266	192	128
1 7/8	.....	.....	3400	2000	1356	872	672	411	302	257	185	124
2	.....	5600	3000	1900	1295	834	648	395	293	249	178	120
2 1/8	.....	.....	.....	.....	1238	800	623	381	285	240	172	116
2 1/4	.....	5000	2800	1800	1187	768	599	367	277	233	167	112
2 3/8	.....	.....	.....	.....	1139	738	577	354	269	226	162	108
2 1/2	.....	4600	2500	1700	1095	711	556	343	261	219	157	104
2 5/8	.....	.....	.....	.....	1052	687	537	332	253	212	152	100
2 3/4	.....	4200	2300	1500	1017	662	519	321	245	206	148	96
2 7/8	.....	.....	.....	.....	982	636	503	311	237	201	144	92
3	.....	3900	2200	1400	949	611	487	302	230	196	140	88

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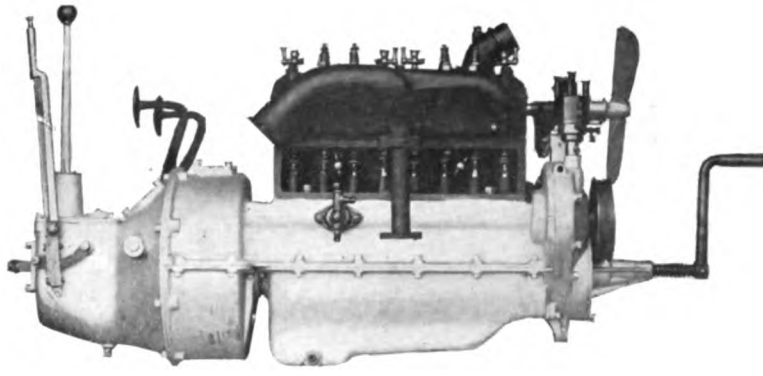

A New Four-Cylinder Model

IN TWO SIZES

for
TWO PASSENGER
LIGHT CARS
MODEL A
3″ Bore 4″ Stroke

for
FOUR PASSENGER
LIGHT CARS
MODEL L-L
3½″ 3¼″ Bore 5″ Stroke

Both models have been subjected to most exhausting and exacting tests with the result that they have been adopted as standard wherever tried.

First Class Product. First Class Delivery

LYCOMING FOUNDRY & MACHINE CO.
WILLIAMSPORT, - PENNSYLVANIA

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DRILL SIZES FOR STANDARD THREADS

These sizes give an allowance above the bottom of thread on sizes 3/16 to 2; varying respectively as follows: for " V " Threads, .010″ to .055″; for U. S. S. and Whitworth threads .005″ to .027″.

These are found by adding to the size at bottom of thread 1/4 of the pitch for " V " threads, and 1/8 of the pitch for U. S. S. and Whitworth, the pitch being equal to 1″ ÷ No. of threads per 1″.

In practice it is better to use a larger drill if the exact size called for cannot be had.

Size Screw	No. of Threads	Size of Drill			Size Screw	No. of Threads	Size of Drill		
		U. S. S.	" V "	W.			U. S. S.	" V "	W.
1/4	24	.201	.196	.202	15/16	9	.808	.790	.810
1/4	20	.191	.184	.192	1	8	.854	.832	.856
5/16	18	.248	.239	.249	1 1/16	8	.917	.894	.919
3/8	16	.302	.293	.303	1 1/8	7	.957	.932	.960
7/16	14	.354	.345	.355	1 1/4	7	1.082	1.057	1.085
1/2	13	.409	.399	.410	1 3/8	6	1.179	1.144	1.182
1/2	12	.402	.391	.403	1 1/2	6	1.304	1.269	1.307
9/16	12	.465	.453	.466	1 5/8	5 1/2	1.412	1.372	1.416
5/8	11	.518	.506	.520	1 5/8	5	1.390	1.347	1.394
11/16	11	.581	.568	.583	1 3/4	5	1.515	1.472	1.519
3/4	10	.632	.618	.634	1 7/8	5	1.640	1.597	1.644
13/16	10	.695	.680	.697	1 7/8	4 1/2	1.614	1.566	1.619
7/8	9	.745	.728	.747	2	4 1/2	1.739	1.691	1.744

DRILL SIZES FOR S. A. E. THREADS

Size of Tap	Size of Drill
1/4 inch x 28 threads	7/32 inch
5/16 " x 24 "	17/64 "
3/8 " x 24 "	21/64 "
7/16 " x 20 "	3/8 "
1/2 " x 20 "	7/16 "
9/16 " x 18 "	1/2 "
5/8 " x 18 "	9/16 "
11/16 " x 16 "	39/64 "
3/4 " x 16 "	43/64 "
7/8 " x 14 "	25/32 "
1 " x 14 "	29/32 "
1 1/8 " x 12 "	1 1/64 "
1 1/4 " x 12 "	1 9/64 "
1 3/8 " x 12 "	1 17/64 "
1 1/2 " x 12 "	1 25/64 "

The above tap drills allow a thread within 1-24 in. of full thread.

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Denby trucks are fitted to a business—not tacked on to it.

It takes trained men, with skill and experience in solving haulage problems, to make this adjustment.

Our Traffic Efficiency Department is made up of such men—and their advice is yours for the asking.

That's why every Denby truck in use is the best possible argument for the sale of another.

Denby : : : Detroit

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Models for 1915

Six splendid new body designs, mounted on a chassis of proven mechanical perfection—simplified, refined, yet not embodying radical changes in principle—make up the Detroit Electric line for 1915. These new models include broughams of varying passenger capacity, with front, rear or duplex drive; also a cabriolet.

Listed here are the new Detroit Electric models:

Model 50—Cabriolet Roadster $2650
Model 51—Rear Drive Brougham—Worm Gear $2850
Model 52—Duplex Drive Brougham—Worm Gear $3000
Model 53 — Large Forward Drive Brougham—Worm Gear.....$2950
Model 54—Large Rear Drive Brougham—Worm Gear $2950
Model 55—Bevel Gear Drive Brougham $2600

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Builders of the Detroit Electric

Baker Electrics

are higher priced, but every extra dollar put into their construction is worth ten to the owner in the saving of repairs.

"Baker Service Follows Every Baker"

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MAKERS OF

Baker Coupes, Broughams, Roadsters and Trucks

Cleveland, O. Live Dealers wanted in Open Territory

KOSMATH

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Model 14—**$960** Panel Body

ANY TYPE OF BODY FURNISHED. UNIT POWER PLANT. 3 SPEED SLIDING GEARS. EISEMAN MAGNETO

BUILT FOR HARD SERVICE

"Ask the man who owns more than one"

THE KOSMATH COMPANY

708 FORD BUILDING

Detroit, Mich.

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WEIGHT IN POUNDS OF A LINEAL FOOT OF ROUND, SQUARE AND OCTAGON STEEL

Size in Inches	Round	Octagon	Square	Size in Inches	Round	Octagon	Square
1/16	.010	.011	.013	2 1/2	16.79	17.71	21.37
1/8	.042	.044	.053	2 5/8	18.51	19.52	23.56
3/16	.094	.099	.120	2 3/4	20.31	21.42	25.86
1/4	.168	.177	.214	2 7/8	22.20	23.41	28.27
5/16	.262	.277	.334	3	24.17	25.50	30.78
3/8	.378	.398	.491	3 1/8	26.23	27.66	33.40
7/16	.514	.542	.655	3 1/4	28.37	29.92	36.12
1/2	.671	.708	.855	3 3/8	30.59	32.27	38.95
9/16	.850	.896	1.082	3 1/2	32.90	34.70	41.89
5/8	1.049	1.107	1.336	3 5/8	35.29	37.23	44.94
11/16	1.270	1.339	1.616	3 3/4	37.77	39.84	48.09
3/4	1.511	1.594	1.924	3 7/8	40.33	42.54	51.35
13/16	1.773	1.870	2.258	4	42.97	45.33	54.72
7/8	2.056	2.169	2.618	4 1/4	48.51	51.17	61.77
15/16	2.361	2.490	3.006	4 1/2	54.39	57.37	69.25
[illegible]	2.686	2.833	3.420	4 3/4	60.60	63.92	77.16
1 1/8	3.399	3.585	4.328	5	67.15	70.83	85.50
1 1/4	4.197	4.427	5.344	5 1/4	74.03	78.08	94.26
1 3/8	5.078	5.356	6.466	5 1/2	81.25	85.70	103.45
1 1/2	6.044	6.374	7.695	5 3/4	88.80	93.67	113.07
1 5/8	7.093	7.481	9.031	6	96.69	101.99	123.12
1 3/4	8.226	8.674	10.474	7	131.61	138.82	167.58
1 7/8	9.443	9.960	12.023	8	171.90	181.32	218.88
2	10.744	11.332	13.680	9	217.57	229.48	277.02
2 1/8	12.129	12.793	15.443	10	268.60	283.31	342.00
2 1/4	13.598	14.343	17.314	11	325.01	342.80	413.82
2 3/8	15.151	15.981	19.291	12	386.79	407.97	492.48

AIR PRESSURES FOR INFLATING PNEUMATIC TIRES RECOMMENDED BY LEADING MAKERS

Diameter of Tire, Inches	Maximum Weight on Wheel, lbs.	Air Pressure in Tire, lbs. per Square Inch
2 1/2	225	50
3	350	60
3 1/2	600	70
4	750	80
4 1/2	1,000	90
5	1,000	90

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FANS

The Hardy Radiator Fan

is a fan of high quality
and efficiency.
Our special attention is
given to the design and
manufacturing of radiator
fans of the very highest
efficiency and quality at a
very low cost.
Send us your blue print
or size of motor and let
us prove to you our price
and goods are right.

Hardy Manufacturing Company

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4 cents a pound

Save money by the use of gritless cloths, which leave no lint behind on cotter pins, bolts, etc.

Our absolutely fresh, clean cloths are worth four cents a pound. In pure white they are worth six and a half cents.

Other qualities and colors quoted on application.

We make a specialty of supplying the automobile industry. Let us know your needs.

CADILLAC PAPER COMPANY
Corner of East Grand Blvd. and Hastings Street
Detroit Mich.

HARD FIBRE

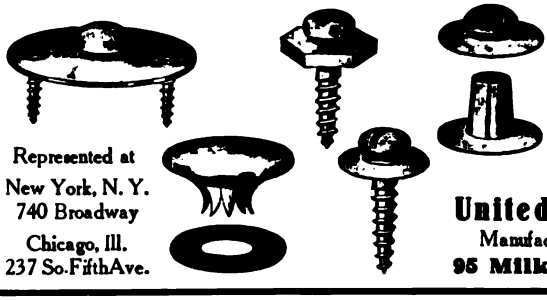
IN ALL FORMS

Brake Bands, Washers, Cleats, Timer Rings, Spark Coil Covers

We wish to emphasize the great advantages of HARD FIBRE TUBING for carrying the ignition cables in motor cars. We make a special design of tubes for this purpose. Write us for prices.

Eastern Hard Fibre Co., 50 Church Street, NEW YORK, N. Y.

FASTENERS



Of Every Size and Style. Used on all the Leading Cars. Prompt Deliveries in any Quantity. Write for Prices.

Represented at
New York, N. Y.
740 Broadway
Chicago, Ill.
237 So. Fifth Ave.

United States Fastener Company
Manufacturers of Snap Fasteners and Metal Goods
95 Milk Street, Boston, Mass.

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ANTI-FREEZING MIXTURES

The percentage of alcohol, by volume, to give a certain freezing point can be obtained from the table below:

Freezing Point, Degrees Fahrenheit	DENATURED		WOOD	
	Alcohol, per Cent.	Water, per Cent.	Alcohol, per Cent.	Water, per Cent.
10	28	72	17	83
0	40	60	24	76
10	52	48	31	69
20	63	37	38	62

So little water is lost by evaporation that it is only necessary to add alcohol to the system, from time to time, to replace that which is used up.

The proportions of glycerine and water may be obtained from the table:

Freezing Point	Glycerine	Water
+28 degrees Fahrenheit	10 per cent.	90 per cent.
+15 degrees Fahrenheit	30 per cent.	70 per cent.
+ 5 degrees Fahrenheit	40 per cent.	60 per cent.
0 degrees Fahrenheit	48 per cent.	52 per cent.
− 5 degrees Fahrenheit	54 per cent.	46 per cent.
−10 degrees Fahrenheit	58 per cent.	42 per cent.

The difficulties in the way of using glycerine and water alone have led to the use of a mixture containing alcohol in addition. The alcohol and glycerine are generally added in equal parts to the water, the amount depending upon the freezing point desired. The percentage of mixture to add may be obtained from the accompanying table:

Freezing Point	Mixture Glycerine and Alcohol	Water
+20 degrees Fahrenheit	15 per cent.	85 per cent.
+15 degrees Fahrenheit	20 per cent.	80 per cent.
+10 degrees Fahrenheit	24 per cent.	76 per cent.
+ 5 degrees Fahrenheit	27 per cent.	73 per cent.
0 degrees Fahrenheit	29 per cent.	71 per cent.
− 5 degrees Fahrenheit	30 per cent.	70 per cent.
−15 degrees Fahrenheit	32 per cent.	68 per cent.

Calcium chloride in water is another solution that has been used with success. When purchasing calcium chloride it is very important to ask for the chemically pure salt as the commercial variety contains free acid which reacts on the metal parts of the cooling system. If it is impossible to obtain the former, the latter may be made fit for use by neutralizing the acid. To do this, add ammonia or soda ash gradually to the calcium chloride solution until blue litmus paper no longer turns pink when moistened with the solution. The amount of calcium chloride to use may be found from the table:

Pounds of Calcium Chloride per Gallon	Freezing Point, Degrees Fahrenheit
2	18.0 above zero
3	1.5 above zero
4	17.0 below zero
5	39.0 below zero

Index to Tables and Data appears on Pages 27 to 30.

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WHAT DO YOU KNOW

¶ About Efficiency ?

What is it?
How attained?
How determined?
How do you know that you are not losing money through an inefficient truck installation?

¶ About Costs ?

What does your truck cost?
What is to be included in truck costs?
How can costs be kept track of?
What do horses cost?
How can different units be compared?

¶ About Loading Schemes ?

What have they to do with efficiency?
How much of the time is your truck idle?
Is all of this idle time necessary?
How do you know?
What are others in your business doing?

¶ About Types of Vehicles ?

Are you buying?
How many vehicles do you know about, really know all through?
What types are best adapted to your needs?
What are the latest ideas?
What have you to choose between at your price?

¶ About Maintenance ?

How good is your driver?
How many miles do you get from a gallon of gasoline?
How many should you get?
Are your repair bills due to carelessness or normal wear and tear?
What information would you like to have?

¶ All this and more you can learn by studiously reading

The COMMERCIAL VEHICLE

Read by Business Men

The oldest and largest truck paper

Devoted to motor truck efficiency

Published twice a month. Subscription $2.00 a year in United States, Canada and Mexico; other countries, $3.00.

231-241 West Thirty-ninth Street, New York City

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DIMENSIONS OF STANDARD WEIGHT WROUGHT-IRON PIPE

1¼ and smaller proved to 300 pounds per square inch by hydraulic pressure.
1½ and larger proved to 500 pounds per square inch by hydraulic pressure.

Standard Pipe Size.	Actual Outside Diameter.	Thickness.	Actual Inside Diameter.	Inside Circumference.	Outside Circumference.	Length of Pipe per square foot of inside surface.	Length of Pipe per square foot of outside surface.	Inside Area.	Outside Area.	Length of Pipe containing one cubic foot.	Weight per foot.	No. of Threads per inch of screw.	Taper of threads per inch of screw.
Ins.	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ft.*	*Ft.*	*Ins.*	*Ins.*	*Ft.*	*Lbs.*		*In.*
⅛	0.405	0.068	0.270	0.848	1.272	14.15	9.44	0.0573	0.129	2533.8	0.243	27	1/32
¼	.54	.088	.364	1.144	1.696	10.49	7.075	.1041	.229	1385.8	.422	18	1/32
⅜	.675	.091	.494	1.552	2.121	7.73	5.657	.1917	.358	754.36	.561	18	1/32
½	.84	.109	.623	1.957	2.639	6.13	4.547	.3048	.554	473.91	.845	14	1/32
¾	1.05	.113	.824	2.589	3.299	4.635	3.637	.5333	.866	270.03	1.126	14	1/32
1	1.315	.134	1.048	3.292	4.131	3.645	2.904	.8626	1.358	166.62	1.670	11½	1/32
1¼	1.66	.140	1.380	4.335	5.215	2.768	2.301	1.496	2.164	96.27	2.258	11½	1/32
1½	1.90	.145	1.611	5.061	5.969	2.371	2.01	2.038	2.835	70.73	2.694	11½	1/32
2	2.375	.154	2.067	6.494	7.461	1.848	1.608	3.356	4.430	42.91	3.600	11½	1/32
2½	2.875	.204	2.468	7.753	9.032	1.547	1.328	4.784	6.492	30.08	5.773	8	1/32
3	3.50	.217	3.067	9.636	10.996	1.245	1.091	7.388	9.621	19.48	7.547	8	1/32

SIZING AND CUTTING OF GEAR WHEELS

The word "diameter," when applied to gears, is always understood to mean the pitch diameter.

Diametral pitch of the gear is the number of teeth to each inch of its pitch diameter.

If a gear has 40 teeth and the pitch diameter is 4 inches there are ten teeth to each inch of the pitch diameter, and the diametral pitch is 10, or in other words the gear is 10 diametral pitch.

Circular pitch is the distance from the center of one tooth to the center of the next tooth, measured along the pitch circle.

If the distance from the center of one tooth to the center of next tooth, measured along the pitch circle, is ½ inch the gear is ½ inch circular pitch.

The diametral pitch given, to obtain the circular pitch divide 3.1416 by the diametral pitch.

If the diametral pitch is 4 divide 3.1416 by 4, and the quotient, .7854 inch is the circular pitch.

(Continued on page 644.)

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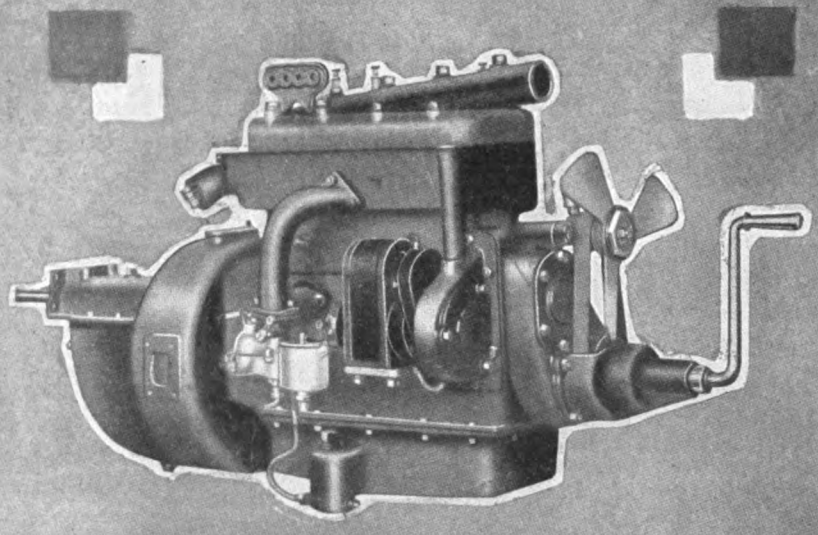
The FARMER ENGINE



THE FARMER IS THE HIGHEST TYPE CYCLECAR ENGINE

NO longer is the cyclecar considered a fad—**it is a fact.** It has come to stay; and the demand is obvious. Those manufacturers who would reap the benefit of this and secure the appreciation of knowing cyclecar buyers, will equip their machines with the

FARMER ENGINE

Type A motor has been designed for cyclecars and very small cars. Much thought has been given this motor in making it adaptable to the different requirements of chassis design. This 18 H.P. engine may be had as an open motor with or without cone clutch or with coupling for friction drive, and as a unit power plant with cone clutch with three speed and reverse transmission completely housed.

Stroke-bore ratio is 1.45. Experience has proved this is most satisfactory for small car work.

Cylinders and crank-case in the FARMER ENGINE are cast en bloc with integral intake and exhaust manifolds of easy sweep and large area.

Crankshaft is of two-bearing type with 1½ inch main journals and 1⅜ inch crank pins. This shaft is exceedingly stiff and rigid; it is given a scientific double heat treatment. The grey iron pistons are fitted with 3/16 inch rings and weigh but one pound, one ounce; but neither length nor strength has been sacrified to obtain this weight.

The **FARMER ENGINE** ignition is obtained by low or high tension magneto or by timer. Every feature of this engine is made as perfect as skilled designing and expert workmanship can produce.

The **FARMER ENGINE** in power, smoothness of operation, length of time and economical fuel consumption is all that can be desired.

Write for complete information.

FARMER MANUFACTURING CO.

Fordyce and Marston Sts. DETROIT, MICH.

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The circular pitch given, to obtain the diametral pitch divide 3.1416 by the circular pitch.

If the circular pitch is 2 inches, divide 3.1416 by 2, and the quotient, 1.5708, is the diametral pitch.

The number of teeth and the diametral pitch given, to obtain the pitch diameter divide the number of teeth by the diametral pitch.

If the number of teeth is 40 and the diametral pitch 4 divide 40 by 4, and the quotient, 10, is the pitch diameter.

The number of teeth and the diametral pitch given, to obtain the whole diameter or size of blank of gear add 2 to the number of teeth and divide by the diametral pitch.

If the number of teeth is 40 and the diametral pitch is 4 add 2 to the 40, making 42, and divide by 4; the quotient, 10½ is the whole diameter of the gear or blank.

The number of teeth and the diameter of the blank given, to obtain the diametral pitch add 2 to the number of teeth and divide by the diameter of the blank.

If the number of teeth is 40, and the diameter of the blank is 10½ inches, add 2 to the number of teeth, making 42, and divide by 10½; the quotient, 4, is the diametral pitch.

The pitch diameter and the diametral pitch given, to obtain the number of teeth multiply the pitch diameter by the diametral pitch.

If the diameter of the pitch circle is 10 inches and the diametral pitch is 4 multiply 10 by 4, and the product, 40, will be the number of teeth in the gear.

The whole diameter of the blank and the diametral pitch given, to obtain the number of teeth in the gear multiply the diameter by the diametral pitch and subtract 2.

If the whole diameter is 10½ and the diametral pitch is 4 multiply 10½ by 4 and the product, 42 less 2, or 40, is the number of teeth.

The thickness of a tooth at the pitch line is found by dividing the circular pitch by 2, or divide 1.57 by the diametral pitch.

If the circular pitch is 1.047 inches, or the diametral pitch is 3, divide 1.047 by 2 or 1.57 by 3, and the quotient, .523 inch, is the thickness of the tooth.

The whole depth of a tooth is found by dividing 2.157 by the diametral pitch.

If the diametral pitch of a gear is 6, the whole depth is 2.157 divided by 6, equals .3595.

The whole depth of a tooth is about 11-16, or exactly .6866 of the circular pitch.

If the circular pitch is 2 the whole depth of tooth is about 11-16 of 2 inches, or 1⅜ inches nearly.

The distance between the centers of two gears is found by adding the number of teeth together and dividing half the sum by the diametral pitch.

If two gears have 50 and 30 teeth, respectively, and are 5 pitch, add 50 and 30, making 80, divide by 2, and then divide the quotient, 40, by the diametral pitch, 5, and the result, 8 inches, is the center distance.

Index to Tables and Data appears on Pages 27 to 30.

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EVERY MANUFACTURER, ENGINEER,
SALESMAN AND DEALER CAN
USE THE 1915

TRUCK SPECIFICATIONS

Compiled by

The Commercial Vehicle

covering

367 Model Chassis

made by

257 Truck Manufacturers

as

Published in the January 1, 1915, issue

of

The COMMERCIAL VEHICLE

239 West Thirty-ninth Street
New York City

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NATIONAL AUTOMOBILE AND ALLIED ORGANIZATIONS

AUTOMOBILE CHAMBER OF COMMERCE, Inc.

7 East 42d St., New York, N. Y.

Objects: To foster the interests of those engaged in the trade or business of manufacturing automobiles and all other self-propelling vehicles.

To reform abuses relative thereto.

To secure freedom of its members from unjust or unlawful exactions.

To diffuse accurate and reliable information as to the standing of merchants and others dealing with members as to all inventions, patents, processes or devices designed or intended for use in, upon, or in connection with such vehicles and the manufacture thereof, as to the state of the art relative thereto, and as to the condition and development of the trade in which the members are engaged, in the United States and foreign countries.

To procure uniformity and certainty in the customs and usages of such trade.

To promote the construction of better highways.

To advocate the enactment of just and equitable laws affecting members.

To settle differences between members.

To promote a more enlarged and friendly intercourse among business men engaged in such trade or dealing with persons engaged therein.

To acquire by grant, gift, purchase, devise or bequest, to hold and to dispose of such property as the purposes of the corporation shall require, subject to such limitations as may be prescribed by law, including inventions, letters patent and processes, or rights thereunder, for the benefit of its members and not for pecuniary profit.

Officers

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Vice-President, Wilfred C. Leland
Secretary, R. D. Chapin
Treasurer, George Pope
Gen. Manager, Alfred Reeves

SOCIETY OF AUTOMOBILE ENGINEERS

1790 Broadway, New York, N. Y.

Object: To promote the arts and sciences connected with engineering and mechanical construction of automobile vehicles.

Officers

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Vice-President	Wm. Guy Wall
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AUTOMOBILE TRADE CREDIT ASSOCIATION

80 Wall St., New York, N. Y.

Object: To protect members against irresponsible debtors; collect and disseminate credit information

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Secretary and Treasurer, Franz Neilson, 80 Wall St., New York, N. Y.

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DISCO

STARTING
LIGHTING
IGNITION

FOR ALL CARS

"It Spins the Motor"

"One Grade Only,
And That The Best"

Disco Electric Starter Co.
Detroit, U. S. A.

Transform Your Car Into a Limousine

NEW FORD WINTER TOP F. O. B. DETROIT

$100.00

For All 1914 and 1915 Ford Touring Cars

Guaranteed to be superior to any other Ford Winter Top on the market. Fully ventilated. Can be quickly and easily attached! Remove windshield and top, attach Winter Top, using regular top attachment. Improves car's appearance, increases pleasure of motoring, insures warmth and comfort. Equipped with rain-vision windshield.

Attach in the Winter
Detach in the Summer

Agents and Dealers: Write for Terms and Exclusive Territory.

Prepared to produce in large quantities for immediate delivery.

The Wolverine Winter Top Co.
6 Elizabeth, West Detroit, Mich.

Manufacturers of High Grade Winter Tops for Ford Cars

EVER CIRCULARIZE?

May be you have had experience with incomplete and obsolete lists, if so, you will appreciate the thorough and up-to-date listing of the trade as exemplified by THE AUTOMOBILE TRADE DIRECTORY'S MAILING LIST.

This List is acknowledged to be the only complete work of its kind in existence, and one in great demand among manufacturers, who "follow up" their advertising through the mails.

You can secure a copy for your own use—a letter of request will bring the details.

The Automobile Trade Directory
243-49 West 39th Street - New York

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MOTOR AND ACCESSORY MANUFACTURERS

33 West 42d St., New York, N. Y.

Objects: To promote in all lawful ways the interests of makers of motors, motor parts, and accessories.
To aid in the protection of its members.
To secure the advantages to be obtained by mutual co-operation.
To facilitate the collection of the claims of its members and the diffusion of information concerning trade, dealers, credits, and other matters of interest to the members of the Association.
To co-operate with similar associations in other states.

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Third Vice-President, F. C. Billings
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Secretary and Asst. Treasurer A. P. Sloan, Jr.
Manager, W. M. Sweet

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29 W. 39th St., New York, N. Y.

Object: The object of this Association shall be to promote the dissemination of knowledge in regard to, and the adoption and use of, electric vehicles for business and pleasure purposes.

Officers

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Vice-President, Walter H. Johnson
Treasurer, H. M. Edwards
Secretary, A. Jackson Marshall

AMERICAN AUTOMOBILE ASSOCIATION

437 Fifth Ave., New York, N. Y.; Riggs Bldg., Washington, D. C.

Objects: To unite in one body all the automobile clubs and individual motorists of the country; to secure reasonable and just legislation.
To aid in proper enforcement of automobile laws and ordinances; to advocate and obtain local, State and Federal aid in the construction and maintenance of good roads.
To encourage touring, and to secure, prepare, and disseminate information relative thereto; and
To support sportsmanlike contests and other movements that will advance motoring interests.

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Treasurer, H. A. Bonnell.
Secretary, John N. Brooks.

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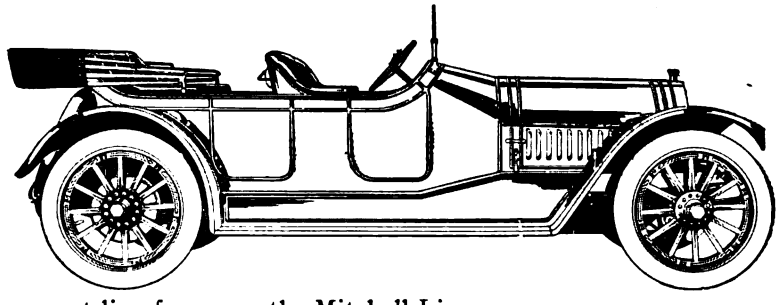
Mitchell CARS



It's a great line for you—the Mitchell Line.

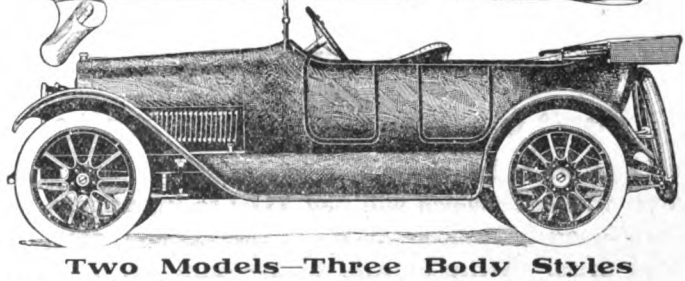
Made by a firm which has been noted for its progressive and honest business methods during its Seventy-nine years of successful experience in manufacturing Vehicles, and Twelve years of successful experience in manufacturing Motor Cars.

MITCHELL-LEWIS MOTOR CO., Racine, Wis., U. S. A.

The result of 22 years' successful experience in building motor cars

HAYNES

America's Greatest "Light Six" $1485



Two Models—Three Body Styles

Model 30—America's Greatest "Light Six"—5-passenger touring car, 121″ wheelbase, weight 2950 lbs. **$1485**

Model 30—The Prettiest Roadster in America. **1485**

Model 30—The Haynes "All-Weather" Cabriolet. . . . **1750**

Model 33—The Kokomo "Six"—a "light" 7-passenger touring car, 127″ wheelbase, weight 3050 lbs. **1550**

THE HAYNES AUTOMOBILE COMPANY, 11 MAIN STREET, KOKOMO, IND.

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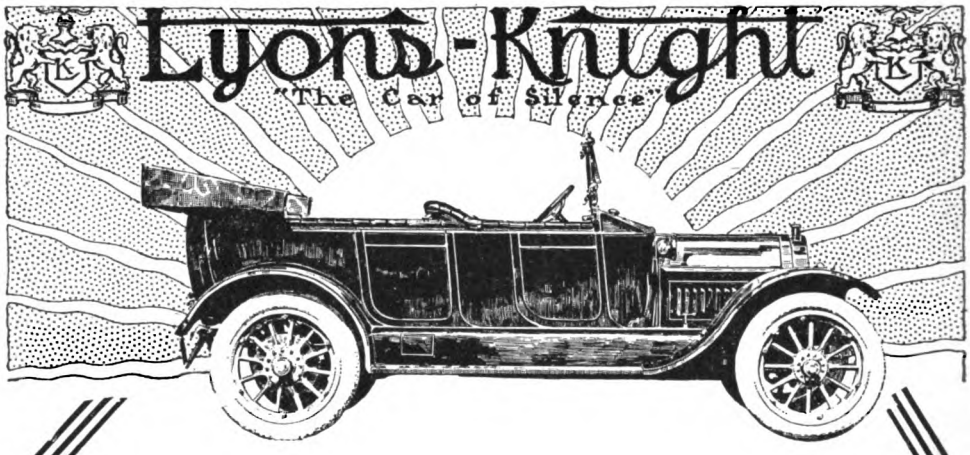

One Year Ago

We made the first announcement of the Lyons-Knight. We told of its silent, improved Lyons - Knight engine, the silent, efficient worm gear drive axle and the many other features that we promised to make this car a greater value.

—And Today

We have made good in every one of our promises. There are Lyons-Knight cars from San Juan to Seattle, from Wisconsin to Texas which are showing this value which we promised. You can find them today in all of the principal cities, and wherever you find them you will see actual evidence of their value.

Don't Overlook this Opportunity

The Lyons-Knight dealers' proposition is an especially attractive one—one which will pay YOU to investigate. There are a few good territories which are still open—perhaps yours is one of them. Write or wire today—find out if your territory is still open and ask for full particulars.

LYONS ATLAS COMPANY

Indianapolis

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HERE AT LAST

A tool for clincher tires that does the business. No ifs, or buts about it. The tire comes off—the tire goes on. You swing the wheel—the Plow does the work. This tool is known as

The Clincher Tire Plow

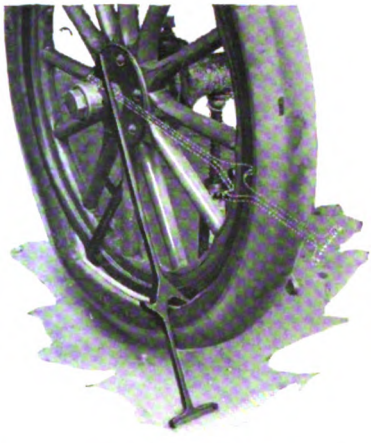
(Patented June 2, 1914. Other Patents Pending.)

because it plows the bead out of the rim, or plows the bead, or beads, back onto the rim. It cannot pinch the tube. It cannot hurt the casing. This Plow represents

A BRAND NEW IDEA

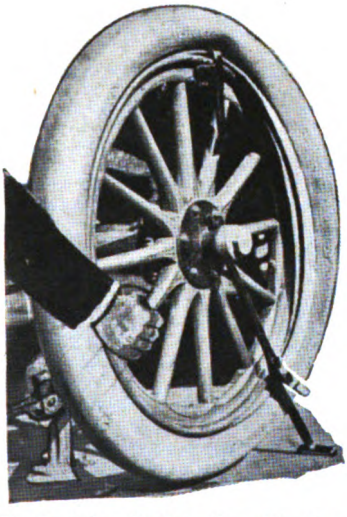
in every feature of its construction, and every feature is patented, or has patents pending on it. It makes a **quick, clean, easy** task of what has been to the average auto user a half hour of confused prying, struggling and sweating. With the Clincher Tire Plow Mr. Average Auto User can **take off or put on a Clincher Tire in 45 seconds** easily. Now study pictures carefully. You'll see it's new—it's a real invention—it isn't a copy, and it works. Thousands of these tools are already in the hands of users, and we have yet to receive our first complaint.

Write for agents' prices and circulars, and be among the first to get the Spring business. We are making special propositions to agents in uncovered territory to introduce the plow. This proposition is just getting started. Join us while it is still a novelty. It will bring people to your place of business.



To Take Off Tire

Insert point of small tool under bead (plow can be used as a lever to start small tool if necessary), bend down and hook cross arm back of spoke (See cut.) Slip out-plowing lug of plow between bead and rim, close to small tool, straight end resting on hub. Turn wheel until outer end of plow is a foot from ground. (See dotted lines.) Whirl wheel forward, letting outer end of plow strike ground. Plow stops and plows bead out of rim as wheel continues to rotate. A few such blows will detach the worst rusted beads from rim. Lift casing from wheel with long pointed shank.



To Put On—Either One Bead or Both

Start with valve stem at top, press bead or beads into the rim for a few inches on either side of valve stem, hook reverse end of small tool over rim to one side, and tire plow to other side of valve stem. Rotate wheel till plow is in striking position and proceed as when taking off. Plow is reversible; works in either direction. When putting on both beads at once, plow forces beads to overlap and protect tube. Plow cannot hurt casing or tube in either operation.

THE CLINCHER TIRE PLOW CO., 818 PENOBSCOT BUILDING, DETROIT

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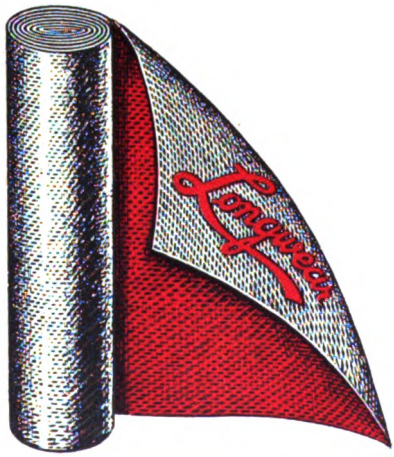
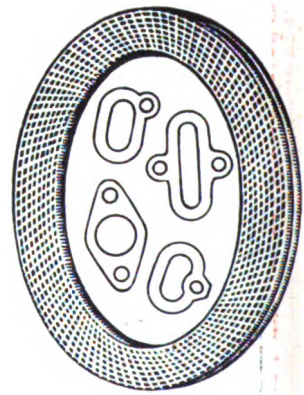
ASBESTOS BRAKE LINING

Won't get Hard. Will never "squeak." Made of Pure Asbestos Threads in which are embedded fine brass wires, the threads being then woven into a solid mass by a patented process, then thoroughly impregnated with a compound that renders the finished article absolutely waterproof, grease, oil and mudproof, yet leaves it sufficiently pliable to act quickly at all times.





ASBESTOS AUTOMOBILE BRAKE BAND LINING and CLUTCH FACINGS.
FLANGE GASKETS,
MANHOLE AND HANDHOLE GASKETS,
PISTON AND SHEET PACKINGS.

Manufactured by

Asbestos & Rubber Works of New Jersey

Mills and Office: CAMDEN, NEW JERSEY

JOHN H. SCUDDER, Pres. JOS. A. WHITNEY, Sec. JOHN M. SCUDDER, Treas.

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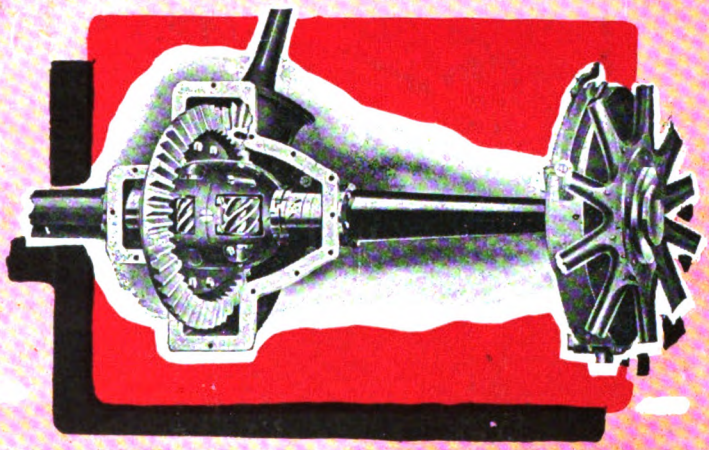
M&S Differential



There Are 10 Surprisingly Sound Reasons Why You Should Install the M. & S. Differential Into Your Car. Read Them:—

First:—Adapted to any make of car without change in rear axle system.
Second:—Power equalized on both wheels when car is turning.
Third:—Increased efficiency of the motor of your car.
Fourth:—Less wear on rear set of tires.
Fifth:—Even running of car by reason of power applied evenly to both wheels.
Sixth:—Greater mileage to each gallon of gasoline used.
Seventh:—Impossible for one wheel to skid or spin in mud-holes or sand, when other rear wheel has traction.
Eighth:—Will eliminate 75% of the use of chains and prevent skidding on wet streets.
Ninth:—Same motor plant will pull more load than with ordinary differential.
Tenth:—A positive pull on two wheels.

Let us give you more complete information.

For particulars regarding the M & S as standard equipment for pleasure cars and trucks

BROWN-LIPE-CHAPIN COMPANY
SYRACUSE, NEW YORK

For agency arrangements on the M & S replacement proposition write

THE M & S GEAR COMPANY
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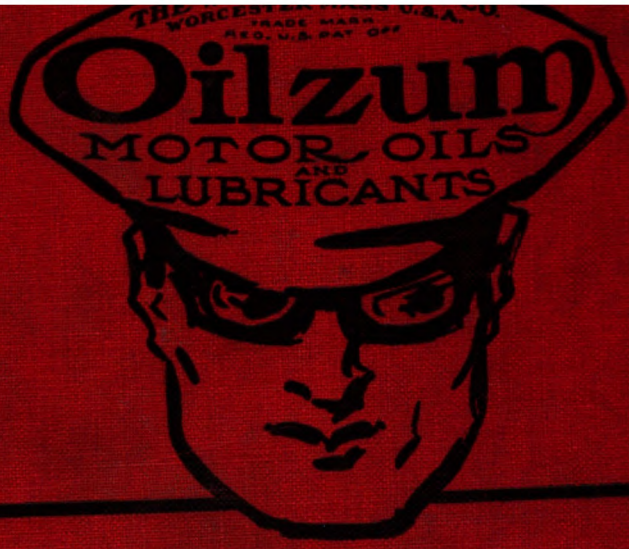

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